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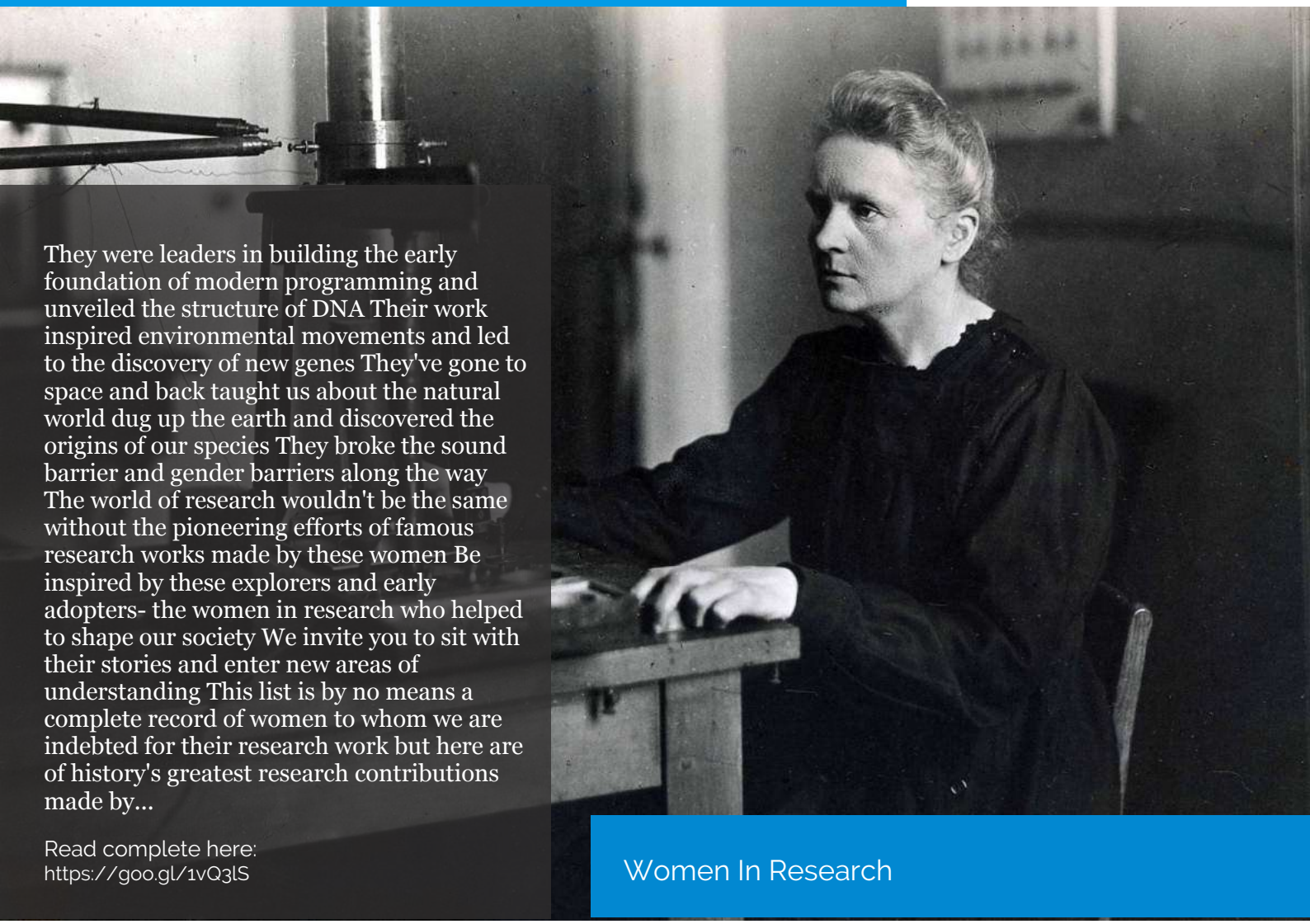

They were leaders in building the early foundation of modern programming and unveiled the structure of DNA Their work inspired environmental movements and led to the discovery of new genes They've gone to space and back taught us about the natural world dug up the earth and discovered the origins of our species They broke the sound barrier and gender barriers along the way The world of research wouldn't be the same without the pioneering efforts of famous research works made by these women Be inspired by these explorers and early adopters- the women in research who helped to shape our society We invite you to sit with their stories and enter new areas of understanding This list is by no means a complete record of women to whom we are indebted for their research work but here are of history's greatest research contributions made by...

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Journal Content
In this Issue

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Yury V. Gnatyuk, Andrey D. Shchukin, Anastasia G. Veryasova & Oleg B. Smirnov

ABSTRACT

Background: Penetrating macular holes (MH) of the retina remain today one of the main reasons for a significant loss of central vision, especially in working age patients. Penetrating MH - acquired disease in which there is a defect in the foveal part of the retina throughout its entire thickness from the inner limiting membrane to the outer segment of the photoreceptor layer. At the same time, the mainstream problem are the validity and effectiveness of treatment of large and giant macular holes with a diameter of more than 500–1000 μm.

Aim: To optimize the treatment method for patients with extensive and long-standing macular holes. To analyze the results of treatment of patients with this disease.

Keywords: macular hole, micro-invasive vitrectomy, platelet-rich plasma, internal limiting membrane.

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ABSTRACT

Background: Penetrating macular holes (MH) of the retina remain today one of the main reasons for a significant loss of central vision, especially in working age patients. Penetrating MH - acquired disease in which there is a defect in the foveal part of the retina throughout its entire thickness from the inner limiting membrane to the outer segment of the photoreceptor layer. At the same time, the mainstream problem are the validity and effectiveness of treatment of large and giant macular holes with a diameter of more than 500–1000 μm.

Aim: To optimize the treatment method for patients with extensive and long-standing macular holes. To analyze the results of treatment of patients with this disease.

Materials and Methods: In 2023, 56 patients were operated on for idiopathic sizeable macular holes. During vitrectomy, a new surgical technique was used for the macular hole bed tamponade with flaps of the internal limiting membrane in combination with the introduction of platelet-rich plasma.

Results: After the resorption of the gas-air mixture (1–1.5 months after surgery), ophthalmoscopically and according to optical coherence tomography data, closure of the macular hole was observed in 51 of 56 operated patients, which amounted to 91.1%.

Conclusions: The surgical treatment technique allows for the closure of large macular holes in 91.1%.

Keywords: macular hole, micro-invasive vitrectomy, platelet-rich plasma, internal limiting membrane.

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I. BACKGROUND

Penetrating macular holes (MH) of the retina remain one of the main reasons for a significant loss of central vision, especially in working-age patients. Penetrating MH - acquired disease, at which a full-thick-ness defect is observed in the foveolar part of the retina — from the internal limiting membrane to the exterior segment of the photoreceptor layer [1]. The yearly prevalence of this disease is 8.69 cases per 100,000 people [2]. The peak incidence falls on the sixth-seventh decade of patients' life; women. are susceptible to this disease 3 times more often than men. In 15–20% of cases, the macular hole develops in both eyes. The occurrence of full-thickness macular holesleads to progressing decrease of visual acuity, appearance of metamorphopsias, and this significantly reduces the patients' quality of life.

The primary method of treatment for macular hole patients is a surgical procedure aimed at the closure of the anatomical defect of the retina in any way, what predetermines future increase of visual functions. To this date, the micro-invasive 25G or 27G vitrectomy with staining and removal of the internal limiting membrane (ILM) to increase the mobility of macular hole's edges with subsequent air-gas tamponade is commonly believed to be a gold standard of treatment for MH patients. As a rule, this method alone allows good

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anatomical results in treatment of small macular holes (of a diameter up to 400 μm) with disease duration up to 6 months.

Among additional mechanisms of intraoperative closure the retinal defect in the foveolar area, the following directions are highlighted [3]:

1. Use an inverted Internal Limiting Membrane (ILM) flap (flaps) or fragment, which is not entirely detached from the macular edge.
2. Mechanical opposition or approximation macular defect edges.
3. Use of bioadhesive substances - of platelet-rich plasma (PRP) or of autologous conditioned plasma (ACP), of autologous blood.

Without an additional use of above-mentioned methods in treatment of large (minimal diameter more than 400 μm) and old (existing more than 6 months) macular holes, acceptable anatomical results are not always achieved. The detection rate of macular holes of III–IV stages (according to the classification by J.D. Gass), according to data of various authors, amounts to 86–93% [4]. In the case of recurrent failure of MH closure, after surgery, it often increases in dimensions, its edges become more rigid, and the patient's visual acuity worsens [5]. If surgical treatment of patients with MH diameter up to 400 μm, according to the majority of the authors' data, is predictable and highly effective (the closure rate reaches 96–97%), the maximal problem today is the reasonableness and effectiveness of treatment of large and giant MH with diameter more than 500–1000 μm. The anatomical success in such cases does not exceed 57-80% [4–9].

The use of an inverted ILM flap method and its variants described by various authors demonstrates a significant increase of the anatomical success in cases with large MH (more than 400 μm) in comparison with the method of the ILM peeling and removal [10–13]. A formed free ILM flap is sufficiently mobile, could be easily divided from the foveolar edge when performing manipulations and by intraocular flows, and its fixation in the lumen of the hole demands from the surgeon performing additional measures. Some authors for the positioning of the ILM flap practice intraoperational introduction of perfluo-rorinated compounds (PFCs), viscoelastics, autologous blood, use of silicone tamponade [6–9, 11, 14].

Thus, further studies and search for effective treatment modes for this surgical problem are actual and sought-after.

The aim of the study is to analyze the results of treatment of patients with large (minimal diameter more than 400 μm) and long-term (more than 6 months) existing MH. To optimize the treatment method for patients with this disease.

II. MATERIALS AND METHODS

The study was performedbased on the Ophthalmology centre of the City Multifunctional hospital No. 2 of Saint Petersburg. The results of treatment of patients operated in the clinical setting of the vitreoretinal department of the center during 2023 for idiopathic large MH were analyzed. In the sample, patients with a history of a long-term MH of stage IV (from 6 months to 3 years), minimal diameter of more than 400 μm, and diameter of the base of more than 700 μm were included. In total, 56 patients (56 eyes) were operated, 40 women (71.4%) and 16 men (28,6%) aged from 58 to 80 years. eleven patients (20%) were pseudophakic. In 7 patients (12.5%) - 5 women and two men - MH were revealed in both eyes.

The distribution of patients according to the diameter of the hole base (maximal diameter) is presented in the diagram (Fig. 1).

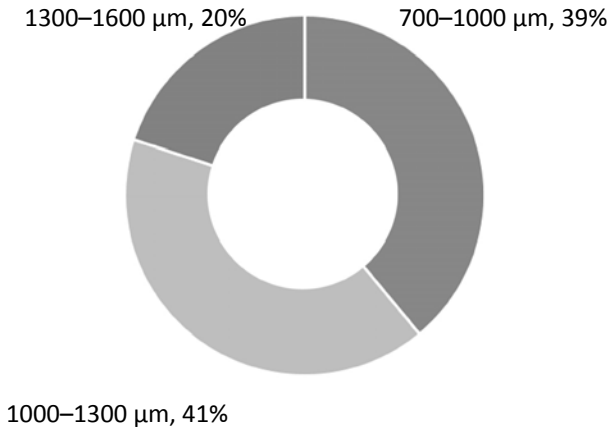


Fig. 1: Distribution of Patients According to the Diameter of the Macular Hole's Base

In 22 patients (39%) and 23 patients (41%), MH dimensions were from 700 to 1,000 µm and from 1,000 to 1,300 µm at the base respectively; in 11 patients (20%), giant MH were noted - from 1,300 to 1,600 µm.

Surgical procedures were performed by the same surgeon on the Constellation device (Alcon, USA) using the Lumera 700 microscope (Carl Zeiss, Germany). Into the study were not included patients with diabetic retinopathy, glaucoma of III–IV stages, high myopia, retinal vascular occlusions and their sequellae, advanced manifestations of macular degeneration. In all patientswere carried on standardophthal-mological examination, as well as optical coherence tomography (OCT) of the macular area in dynamics by the optical coherence tomograph Zeiss Cirrus HD-OCT 5000 (Germany). During the surgical procedure, a combination of the tamponade of the hole bed by a flap (flaps) of the ILM and of the introduction of the platelet-rich plasma into the hole area after the fluid-air exchange was used.

In all patients was performed posterior vitrectomy (25 G), with the removal of the posterior hyaloid membrane of the vitreous. After the ILM staining (Membrane-Blue-Dual dye, DORC, the Netherlands), its peeling was performed, concentrically to the hole edges as several flaps in such a way as to preserve the adhesion of them with macular hole edges. Hereafter, peripheral ends of the flaps were evened by vitrector and placed on the hole's bed using closed ends of endovitreal forceps, delicately, without efforts, producing the hole's tamponade. In our studywas used the inverted ILM flap technique, according to N. Andrew, et al. [15] (Fig. 2).

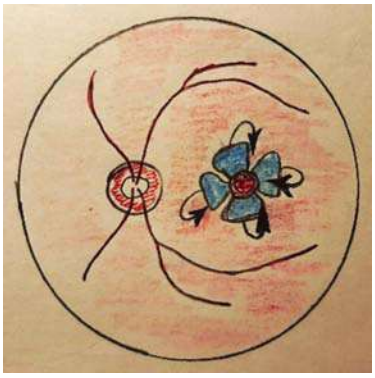


Fig. 2: Inverted ILM flap Technique used

After fluid-air exchange (at control of the position of ILM flaps, 2–3 drops of platelet-rich plasma were introduced on the macular areausing a 25 G cannula; the substance was obtained from the patient's autologous blood using a centrifuge (Rotofix 32A, Hettich, Germany). At the end of

the procedure, into the vitreous cavitywas added, the CF gas (Alcon, USA), the volume being about 1 ml to obtain 20–25% gas-air mixture. There were no intraoperational complications noted.

In the post-op period, patients received standard anti-inflammatory therapy, they were recommended to stay in a face-down position or on the contra-lateral side during 3–4 days after the procedure.

III. RESULTS AND DISCUSSION

To solve the problem, we were guided the following principles:

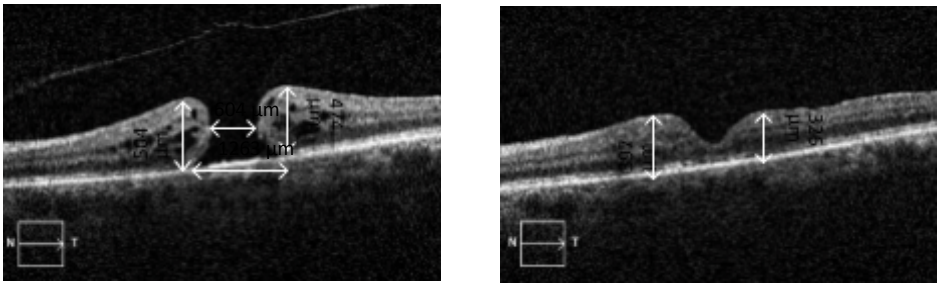
1. The use of an ILM flap (flaps) is, to our mind, a requisite condition and a sufficient measure for the large diameter hole tamponade. As ILM is connected to the neurosensory retinal tissue, it does not pose a risk of pathological changes in its structure, at the same time, the ILM flap is transparent and does not reduce the transparency of optical media.
2. Not to use a mechanical approximation of the hole edges because of their rigidity and high risk of retinal tissue damage.
3. To stimulate the healing of the hole's edges and to increase the ILM flap stabilization during the post-op period, it was decided to use the platelet-rich plasma, obtained from the patient's autologous blood drawn immediately before surgery.
4. To exclude a toxic effect on the retina and the optic nerve, as well as to avoid re-operations, it was decided to refrain from the use of PFO and from the silicone tamponade.

During the early post-op period, there were no complications. Short-time rise of intraocular pressure, caused by the gas-air tamponade, was reversed by a local use of hypotensive medications. After the gas-air mixture resorption, ophthalmoscopically and according to OCT data, there was a MH closure in 51 out of 56 operated patients, making 91.1%. In 5 patients (8.9%), a residual hole in the macular area persisted.The visual acuity of patients before surgery and to the moment of complete gas-air mixture resorption in the vitreous cavity is shown in the table.

According to the data presented in the table, before surgery, in the overwhelming number of patients (85.8%), visual acuity was from 0.01 to 0.1, during the post-op period, in a significant number of patients (76.8%), visual acuity raised up to 0.2–0.3 and higher. As examples, pre- and postoperative OCT results of patients L. and G. and their visual functions are shown on Fig. 3 and 4, respectively.

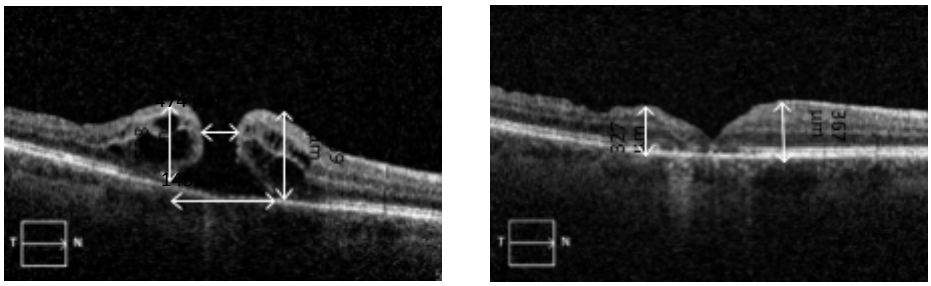
Table 1: Visual Acuity of Patients before and after Surgical Treatment

Visual acuity (with correction)	0.01–0.05	0.06–0.1	0.2–0.3	0.4–0.8	In total
Before surgery	15 (26.8%)	33 (59%)	8 (14.2%)	0	56
After surgery	0	13 (23.2%)	29 (51.8%)	14 (25%)	56



a *b*

Fig. 3: Patient L. Right eye: macular hole stage 4, the macular hole history is longer than a year: *a*— Right eye: Vis before surgery 0.09; *b* — Right eye: Vis after surgery 0.4



a *b*

Fig. 4: Patient G. Right eye: macular hole stage 4, the macular hole history is about 1.5–2 years: *a* — Right eye: Vis before surgery 0.08; *b* — Right eye: Vis after surgery 0.3–0.4

Most of patients after surgery noted an increase in quality of vision. However, despite the anatomical MH closure, many patients, along with a visual acuity increase, noted the preservation of metamorphopsias in one form or another, the necessity to "look closely" by visual acuity testing. We could explain this phenomenon by displacing the fixation point on the background of decreasing retinal oedema after the healing of MH edges. At that, a scotoma could be found in the area of the fovea itself, taking into account large dimensions of observed macular hole along with scar tissue formation.

Evaluating the anatomical outcome of surgery based on the OCT data, it has to be mentioned that in all studied cases. the ellipsoid zone of the foveola was deformed without significant dynamics after successful surgery. A complete MH closure was observed in 51 out of 56 patients (91%). When investigating the cases of macular hole closure, conspicuous is the fact that retinal oedemawas absent in 22 cases (42%), and in 30 eyes (58%), positive dynamics were observed in the form of oedema decrease, restoration of the structure of most of the macular area layers was visualized in 27 (53%), traces of the interior limiting membrane flap was absent in 33 patients (63%), foveolar pseudocysts were visualized in 11 cases (21%), fibrotic changes of external retinal layers at long-term (more than 8 months) were observed in 15 eyes (29%). Quoted data are of preliminary character, as the dynamic follow-up of patients continues.

The central retinal thickness in the foveal area is a new, highly informative index for the prognosis of the anatomical effect of macular hole surgical treatment, superior in prognostic value to most other criteria [16]. In our sample, this index before surgery was 386 ± 146 μm, after surgery, the average thickness in the foveolar area decreased by a mean of 70 μm (18%), and amounted to 269 ± 76 μm (Fig. 5).

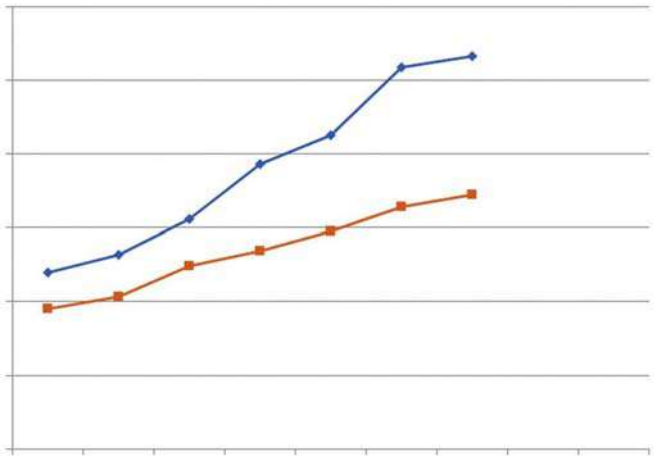


Fig. 5: Distribution of Mean Retinal Thickness before (*1*) and after (*2*) Surgical Treatment of the Macular Hole

In one female patient with moderate degree myopia, 2.5 months after surgery, the development of rhegmatogenous retinal detachment was observed, the cause for which was the appearance of a peripheral retinal tear. In this patient, cerclage scleral buckling was performed, resulting in a blockage of the tear and reattachment of the retina.

IV. CONCLUSIONS

1. The used surgical method of the MH bed tamponade with ILM flaps in combination with the introduction of platelet-rich plasma allows to achieve a closure of large MH in 91.1% of cases.
2. After surgical treatment, many patients mentioned the preservation of scotomata and metamorphopsias, this is due to the formation of scar tissue in the hole area.
3. Further investigations of this problem will serve as a reason for future publications.

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Intrapelvic Migration of Cephalic Screw: Report of two Cases and Review of the Literature

Ortega-Yago A, Balfagón-Ferrer A, Sánchez-Jiménez A & Barrés-Carsí M

La Fe University and Polytechnic Hospital, Valencia Spain

ABSTRACT

Intramedullary nails are widely used to treat extracapsular femoral neck fractures, providing a minimally invasive approach for early weight-bearing. However, in 5% of cases, proper fixation is not achieved. One rare complication is the intrapelvic migration of the cephalic screw, which occurs in less than 0.5% of cases. This study reports two cases of intrapelvic screw migration and reviews the literature on this complication.

A retrospective descriptive study was conducted at our hospital between 2015 and 2022, analyzing two cases of cephalic screw migration following hip fracture treatment. Case 1 involved an 85-year-old male who underwent treatment for a right pertrochanteric fracture with a Gamma 3 nail. Three months post-surgery, the cephalic screw migrated into the pelvic cavity, requiring removal via laparotomy. A partial hip prosthesis was implanted in a subsequent surgery, and the patient recovered successfully.

Keywords: cephalic screw, intrapelvic migration, hip fracture, Gamma 3 nail, PFNA nail, surgery complications.

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Intramedullary nails are widely used to treat extracapsular femoral neck fractures, providing a minimally invasive approach for early weight-bearing. However, in 5% of cases, proper fixation is not achieved. One rare complication is the intrapelvic migration of the cephalic screw, which occurs in less than 0.5% of cases. This study reports two cases of intrapelvic screw migration and reviews the literature on this complication.

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Case 2 involved an 83-year-old female with multiple comorbidities. After a right pertrochanteric fracture was treated with a PFNA nail, the cephalic screw migrated intrapelvically 20 months post-surgery. Due to her comorbidities, the screw was removed through the hip approach, and the patient passed away six months later from pre-existing health issues.

A literature review of 17 reported cases revealed that screw migration often occurs due to improper screw placement, repeated axial loading, and unstable fixation. Prevention strategies emphasize achieving an anatomical reduction, selecting an appropriately sized screw, and proper follow-up to detect complications early. Treatment options include screw removal via open surgery, laparotomy, laparoscopy, or endovascular approaches.

In conclusion, medial migration of the lag screw is rare but significant. Preventing this complication requires optimal fracture reduction, precise screw placement, and proper follow-up to avoid severe consequences for the patient.

Keywords: cephalic screw, intrapelvic migration, hip fracture, Gamma 3 nail, PFNA nail, surgery complications.

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I. INTRODUCTION

Hip fractures are common in the elderly population, accounting for approximately 50% of fragility fractures, with their incidence progressively increasing due to population aging (1,2).

The intramedullary nail is a widely used device in trauma surgery for the treatment of extracapsular femoral neck fractures, as it is minimally invasive and allows for early weight-bearing in frail patients. However, in approximately 5% of cases, the intramedullary nail fails to achieve proper fixation in these fractures (3).

One potential complication in these fractures is cut-in, which can be classified as either early or late cut-in, depending on the stage at which it occurs. A much rarer complication is the migration of the cephalic screw into the pelvic cavity following fracture fixation, occurring in less than 0.5% of cases (4). Due to its rarity, few cases have been reported in the literature, although the complications can be severe given the anatomical location of the screw (5).

The objective of this study is to analyze two cases of intrapelvic migration, assess treatment strategies and long-term complications, and conduct a literature review of previously reported cases.

II. MATERIALS AND METHODS

A retrospective descriptive study was conducted between 2015 and 2022 at our hospital, analyzing cases of cut-in with intrapelvic screw migration as a complication of hip fracture. Two cases of intrapelvic screw migration were identified. Demographic, clinical, and radiological data were collected, along with information on complications observed in outpatient follow-ups. Additionally, a literature review of previously reported cases was performed.

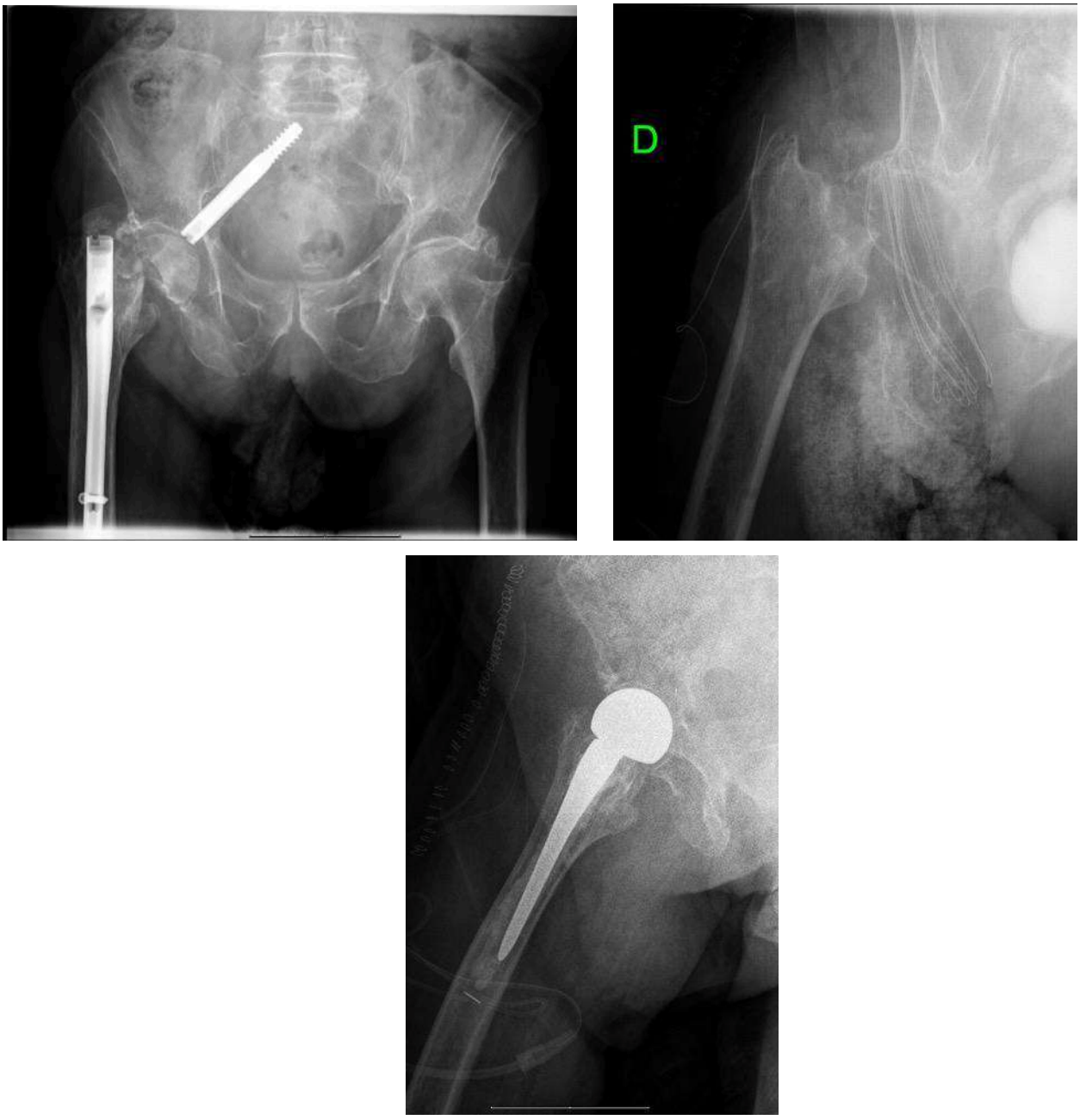
Case 1:

An 85-year-old male presented with a right pertrochanteric hip fracture classified as AO type 31 A 13 (Figure 1) following a low-energy fall. The patient was admitted and underwent surgery the following day, consisting of closed reduction and implantation of a short intramedullary nail (Stryker, Michigan, United States) using a Gamma 3 nail (Figure 2). The cephalic screw was inserted into the subchondral bone in a centre- inferior position.

The postoperative course was uneventful; however, at the three-month follow-up, radiographic evaluation revealed cephalic screw migration into the pelvic cavity. The patient had reported a one-week history of progressive groin pain without prior trauma. Radiographic imaging (Figure 3) demonstrated intrapelvic migration of the screw through the medial wall of the acetabulum. A contrast-enhanced CT scan ruled out damage to intrapelvic organs. The screw was found positioned between the bladder and intestines, necessitating surgical removal in collaboration with the general surgery team via open laparotomy.

Following recovery from the initial procedure, a postoperative control radiograph was obtained (Figure 4). In a subsequent surgery, a cemented partial hip prosthesis was implanted (Figure 5). No bone grafting was required for acetabular reconstruction, as the bone defect was minimal.

The patient recovered successfully from the second surgery, without complications during the two-year follow-up, and was able to ambulate without the need for assistive devices.



Figures 1-5: The top left photo shows an AO type 31 A 13 pertrochanteric fracture. The fracture was subsequently treated with a Gamma 3 nail (top right). Mid-section photos display cephalic screw migration during follow-up. The lower left photo shows the removal of the nail and screw during the first surgery, followed by the implantation of a partial hip prosthesis (lower right) in a second surgery

Case 2:

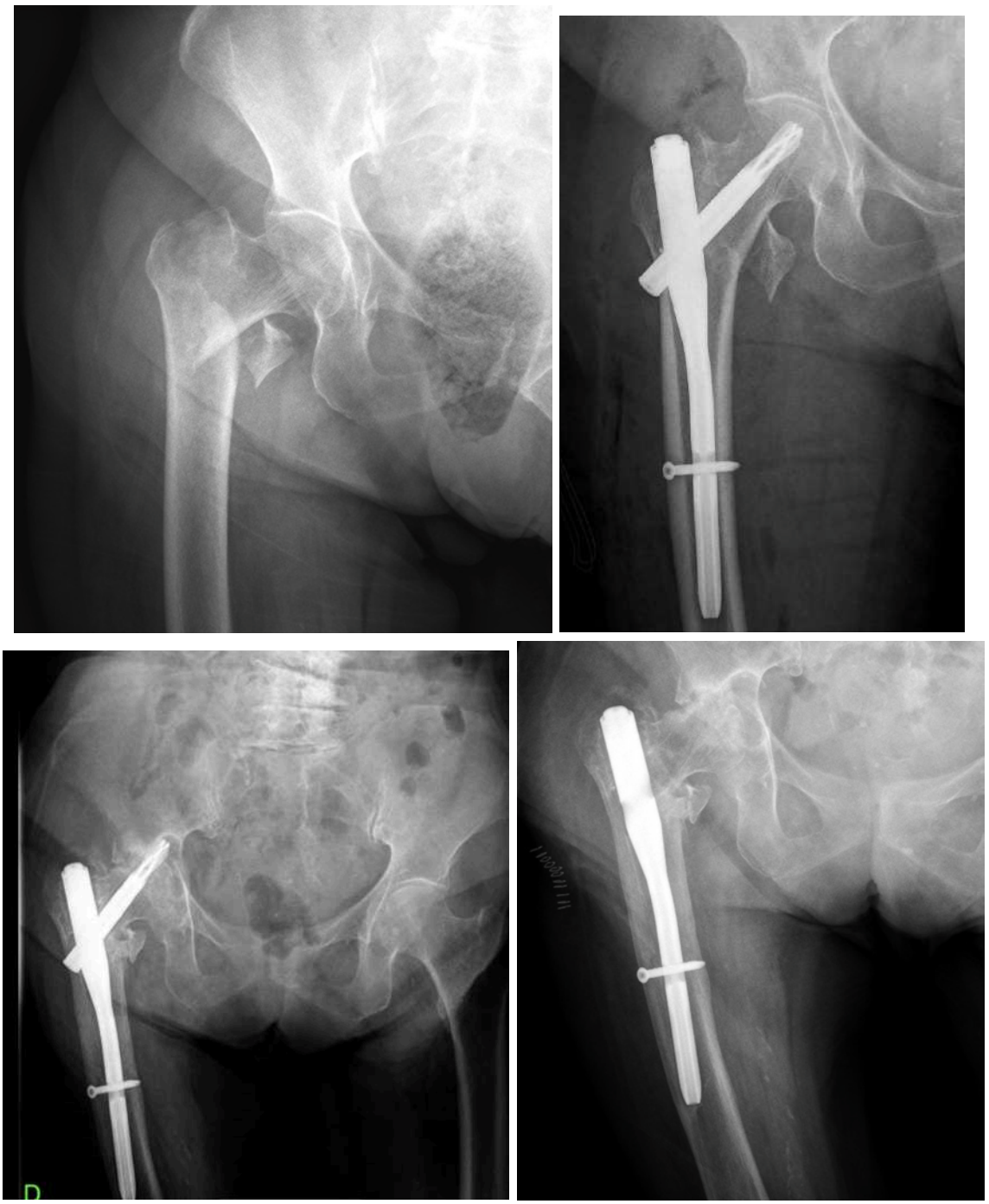
An 83-year-old female with a history of congestive heart failure and poorly controlled diabetes presented to the emergency department with right lower limb pain and functional impairment following a low-energy fall. Radiographs (Figure 6) revealed a right pertrochanteric hip fracture classified as AO type 31 A 13. The patient underwent closed reduction and implantation of a PFNA nail with a cephalic screw placed in a centre -centre position (Synthes, United States) the following day (Figure 7).

The postoperative course was complicated due to the patient's multiple pre-existing comorbidities. At 20 months, after another low-energy fall, radiographs showed intrapelvic migration of the cephalic screw (cut-in) (Figure 8). The patient had reported isolated groin pain for several months

but, due to her comorbidities, had not resumed ambulation and was wheelchair-bound, delaying her medical consultation.

Given the high surgical risk and the fact that she had not ambulated since the initial surgery, the medical team opted for cephalic screw removal while leaving the intramedullary nail in place (Figure 9). This decision was made after an abdominal CT scan ruled out associated complications.

The patient's initial postoperative course was uneventful; however, she ultimately passed away six months later due to her pre-existing comorbidities.



Figures 6-9: The top left photo shows an AO type 31 A 13 pertrochanteric fracture. The fracture was subsequently treated with a Gamma 3 nail (top right). Mid-section photos display cephalic screw migration during follow-up. The lower photos illustrate the isolated removal of the cephalic screw as the chosen treatment, considering the patient's comorbidities

Table 1: Summary of Cases Described in the Literature, Screw Position on Radiographs, and Time from Surgery to Complication

Approach for Nail Removal	N Cases	Position of the Screw	Time from First Surgery until Migration
Laparoscopic	Kuroshima et al (1 case) (6)	Anterior	44 weeks
Open Femoral Approach	Kim et al (1 case) (7)	Centre - Centre	3 weeks
	Lee et al (1 case) (8)	Anterior-medial	2 weeks
	Akçay et al (1 case) (9)	Posterosuperior	8 weeks
	Georgiannos (2 case) (10)	- Medial - Centre - Centre	- 20 weeks - 6 weeks
	Nagura et al (1 case) (11)	Centre -Posterior	20 weeks
	Lozano-Álvarez et al (1 case) (12)	Centre -Inferior	16 weeks
	Flint et al (1 case) (13)	Centre - Centre	28 weeks
	Lal et al (1 case) (14)	Inferior	12 weeks
	Heineman (1 case) (15)	Inferior	3 weeks
	Pinheiro et al (1 case) (16)	Centre - Centre	4 weeks
	Dragan et al (1 case) (17)	Centre-inferior	8 weeks
Intrapelvic approach	Thein et al (1 case) (18)	Antero-superior	5 weeks
	Robinson SJ et al (1 case) (19)	Superior	44 weeks
Endovascular approach	Mousati et al (1 case) (5)	*	4 weeks

III. DISCUSSION

Intrapelvic migration of the cephalic screw is a rare complication, with few cases reported in the literature. Among these (Table 1), the study by Rebuzzi et al. (4) highlighted that while medial migration is rare (<0.5%), it is relatively common (43%) when the screw position is considered high-risk. Regarding prevention strategies to avoid biomechanical implant failure, Georgiannos et al. (10) emphasized that achieving an anatomical reduction is key. Additionally, the appropriate cephalic screw size must be selected, maintaining a tip-apex distance (TAD) of <25 mm. Ideally, the screw should be positioned centrally or inferiorly on radiographs, and proper follow-up is essential to detect complications early.

In many cases, inadequate fracture reduction and improper screw placement, combined with repeated axial loading on an unstable fixation, can lead to displacement of the nail within the femoral canal, producing an effect similar to the "Z-effect."

A similar mechanism was proposed by Weil et al. (20) in their biomechanical study. Some studies have found no significant differences in the need for revision surgery between patients treated with the Gamma 3 nail or the PFNA nail, suggesting that screw placement may be more critical in preventing migration than the implant type itself (21).

Flint et al. (13) analyzed risk factors associated with screw penetration and medial migration, categorizing them into different groups: 1 intraoperative factors related to the surgeon, such as excessive reaming of the femoral head; 2 intraoperative fracture characteristics; 3 implant-related factors, such as screw dysfunction; 4 technical errors, including excessive TAD; and 5 postoperative factors, such as additional trauma. In our cases, the primary reason for failure in the first patient was cephalic screw placement, while in the second case, it was postoperative trauma following a fall.

A detailed clinical history and serial radiographs can aid in the early detection of this complication. In most cases, removal is performed through the previous incision; however, in some instances, due to the intra-abdominal location of the screw, extraction requires open laparotomy or laparoscopy (6), though the risk of injury to major arteries and vital organs remains present. There are also reports of successful cephalic screw removal via an endovascular approach (5). In such cases, a multidisciplinary approach is necessary to safely extract osteosynthesis material while minimizing complications, considering both screw location and the patient's comorbidities. In our two cases, one required open laparotomy in collaboration with general surgeons due to the screw's location, while in the second case, removal was possible through the previous hip approach.

Therefore, optimal fracture reduction and proper screw placement are the most crucial steps in reducing the risk of medial migration of the cephalic screw. However, continued follow-up is essential, as the increasing incidence of hip fractures may lead to a rise in this complication, which, despite its rarity, can have severe consequences for the patient.

IV. CONCLUSIONS

Medial migration of the lag screw is an uncommon but significant complication. Its prevention requires optimal fracture reduction and precise screw placement.

Ensuring correct screw insertion is crucial to avoid undesirable displacement. The biomechanics of intramedullary screws facilitate lateral screw sliding; however, in cases of unstable fixation, medial migration may occur.

Conflict of Interest

The authors declare no conflict of interest.

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Relationship between Triple X Trisomy and ASD in A 2-Year-Old Child in Bom Despacho/Mg

Elen Angela Moura Guedes, Esther Lage Costa, Fernanda Da Conceição Fernandes, Heberth Andrade Silva & Hévylin Caroline Fernandes Silva

ABSTRACT

This study describes the case of a female child diagnosed with Triple X Syndrome and Autism Spectrum Disorder (ASD). The pregnancy was complicated, culminating in delivery at 36 weeks following medical recommendation due to vasa previa and umbilical cord insertion issues. Initial low food intake was observed, requiring intensive nutritional monitoring. During the first months of life, signs of developmental delay and atypical behaviors, such as lack of interaction and sensitivity to sensory stimuli, emerged, prompting the mother to seek specialized evaluation. The initial diagnosis suggested ASD; however, a second neuropediatrician requested genetic tests and additional clinical observations, leading to the discovery of X chromosome trisomy (47,XXX). This condition is associated with variable phenotypic characteristics and, in the described case, contributed to the autistic presentation. Multidisciplinary treatment, including equine therapy, speech therapy, swimming, and specific therapeutic interventions, resulted in significant improvements in the child's social interaction and development. The use of Risperidone helped control some behavioral symptoms. This case highlights the importance of genetic testing in underexplored diagnoses, as well as the essential role of early intervention in improving the quality of life for children with trisomies and ASD.

Keywords: trisomy X, ASD, early diagnosis.

Classification: NLM Code: WS350.8.A8

Language: English

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Relationship between Triple X Trisomy and ASD in A 2-Year-Old Child in Bom Despacho/Mg

Relação Da Trissonomia Do Triplo X Com O Tea Em Criança De 2 Anos Em Bom Despacho/Mg

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RESUMO

Este estudo descreve o caso de uma criança do sexo feminino diagnosticada com Síndrome do Triplo X e Transtorno do Espectro Autista (TEA). A gestação ocorreu com complicações, culminando em parto na 36ª semana, após indicação médica devido a vasa prévia e inserção do cordão umbilical. Observou-se baixa ingesta alimentar inicial, necessitando de acompan-hamento nutricional intensivo. Ao longo dos primeiros meses de vida, surgiram sinais de atraso no desenvolvimento e comportamentos atípicos, como falta de interação e sensibilidade a estímulos sensoriais, o que levou a mãe a buscar avaliação especializada. O diagnóstico de TEA foi inicialmente levantado, porém, uma segunda neuropediatra solicitou exames genéticos e observações clínicas adicionais que culminaram na descoberta da trissomia do cromossomo X (47,XXX). Essa condição está associada a características fenotípicas variáveis e, no caso descrito, contribuiu para o quadro autista. O tratamento multidisciplinar, incluindo equotera-pia, fonoaudiologia, natação e intervenções terapêuticas específicas, trouxe melhorias significativas na interação social e no desenvolvimento da criança. O uso de Risperidona auxiliou no controle de alguns sintomas comportamentais. O caso evidencia a importância de exames genéticos em diagnósticos pouco estudados, bem como o papel essencial da intervenção precoce no aprimoramento da qualidade de vida de crianças com trissomias e TEA.

Palavra Chave: Trissomia do Triplo X, TEA, Diagnóstico precoce.

I. METODOLOGIA

Este estudo trata-se de um relato de caso descritivo, baseado na observação detalhada de um único paciente sobre o tema da relação da trissonomia do triplo X com o TEA em criança de dois anos do sexo feminino. O relato foi acompanhado na própria cidade de Bom Despacho, Minas Gerais, Brasil, durante o período de Dezembro/2021 até Dezembro/2023 através de levantamentos de dados clínicos gestacionais da genitora, dados da criança e relatórios médicos.

O caso foi selecionado devido a relevância clínica do assunto, visto o TEA não ter ainda uma etiologia bem definida, ao qual observou a necessidade de elucidar correlação clínica entre a alteração cromossômica do triplo X e o desenvolvimento do transtorno do espectro autista. O paciente do estudo apresentou sinais de atraso no desenvolvimento e comportamentos atípicos, como falta de interação e sensibilidade a estímulos sensoriais, instigando a genitora a buscar maiores informações sobre o que poderia está acarretando tais modificações de comportamento. No decorrer do levantamento observa a importância da equipe multidisciplinar de profissionais para contribuir no diagnostico inicial do TEA, além de exames genéticos e observações clínicas adicionais que culminaram na descoberta da trissomia do cromossomo X (47,XXX). Essa condição está associada a características fenotípicas variáveis e, no caso

descrito, possivelmente pode ter contribuído para o quadro autista.

Os métodos utilizados na coleta de dados, baseia se em resultados de exames clínicos laboratoriais e genéticos, Abordagem terapêutica e intervenção multidisciplinar de profissionais (Pediatra, Neuropediatra, fonoaudiólogo, psicopedagogo, fisioterapeuta) com realização de testes, observações e entrevistas. O estudo respeitou os princípios éticos da pesquisa, ao qual a genitora está de acordo com o tema levantado, possibilitando esse estudo através do consentimento de dados e informações entregues pela citada.

II. NTRODUÇÃO

A Síndrome do Triplo X é um tipo de aneuploidia cromossômica, por sua vez não muito rara (na proporção de 1:1000 mulheres nascidas), porém pouco diagnosticada. Dessa forma, muitas meninas são portadoras da condição de Trissomia X, o que pode levar à redução das capacidades cognitivas, intelectuais e comportamentais[5].

A trissomia X é uma anomalia dos cromossomos sexuais, com fenótipo variável, causada pela presença de um cromossomo X extra em indivíduos do sexo feminino (47,XXX em vez de 46,XX)[2]. Ao contrário das Síndromes de Down, Klinefelter e Turner, não haviam sido relatados casos clínicos de Trissomia X até que a técnica de cariotipagem estivesse disponível, sendo o primeiro estudo realizado em 1959[4].

A etiologia da trissomia X está relacionada à não disjunção durante a meiose, embora a não disjunção pós-zigótica ocorra em aproximadamente 20% dos casos. A idade materna avançada (conhecida por estar associada a um aumento da probabilidade de eventos de não disjunção) é observada em cerca de 30% dos casos de trissomia X[6]. Diante disso, foram realizados estudos que relacionaram a condição 47,XXX ao estresse na primeira infância, disfunção executiva, TDAH, autismo, estrutura cerebral e doenças autoimunes, respectivamente[3]. Foram encontrados e descritos resultados que associavam a presença do cromossomo X extra a características anormais[6,2].

O autismo é um transtorno do desenvolvimento, que aparece nos primeiros anos de vida e interfere nas habilidades de comunicação, motoras e de interação social. Por se tratar de um transtorno de neurodesenvolvimento, o Transtorno do Espectro Autista caracteriza-se por manifestações comportamentais, seguidas de déficits nos padrões de comportamento, estereotipias, rigidez cognitiva e atividades limitadas[5]. A etiologia do Transtorno do Espectro Autista (TEA) ainda permanece uma incógnita. Evidências científicas indicam que não há uma causa única, mas sim a interação de fatores genéticos e ambientais[9].

Nos últimos anos, inúmeros estudos genéticos vêm sendo associados a doenças mentais e neurológicas, utilizando principalmente a análise de ligação gênica e de biomarcadores. No entanto, poucos genes específicos foram identificados. A maioria deles poderá ser reconhecida quando, literalmente, algumas centenas de indivíduos afetados e seus familiares forem analisados, evidenciando, assim, a necessidade de diagnósticos precoces para o tratamento dessa patologia. Desse modo, acredita-se que os aspectos genéticos e seus biomarcadores podem ser pontos cruciais no estudo do tratamento de TEA[8,1].

III. DESENVOLVIMENTO

Gestação com nascimento na 36ª semana, com parto previamente agendado em razão de a mãe apresentar vasa prévia e inserção do cordão umbilical. Foi feito uso de Dexametasona (6 mg IM) para amadurecimento pulmonar fetal. A mãe tem histórico de AVE isquêmico e epilepsia, em uso do anticonvulsivo Oxcarbazepina 300 mg BID e injeções diárias de Enoxaparina desde a 10ª semana, como medida profilática. Ela também apresenta histórico de três gestações (uma cesárea há 17 anos e dois abortos recorrentes de gestações ectópicas), tem 36 anos, enquanto o pai tem 46 anos.

A criança, do sexo feminino, nasceu pesando 2.890 g, medindo 47 cm, com perímetro cefálico de 34 cm. O teste do coraçãozinho em MSD registrou 100% e em MID, 97%. O teste do

olhinho foi normal. O recém-nascido (RN) apresentou cefalo-hematoma e permaneceu em internação por 72 horas, recebendo alta em boas condições, com peso de 2.585 g e indicação de acompanhamento para icterícia. O screening infeccioso foi negativo. A mãe é A+ e o RN, O+. Aos 13 dias, a criança retornou ao consultório para avaliação pediátrica, quando se constatou perda de 60 g (pesando então 2.525 g). A mãe relatou que a bebê ficava incomodada para mamar, sendo necessário estimulá-la a cada 2 horas, e por diversas vezes ela se recusava a mamar. Notou-se também que era uma criança calma, sonolenta, chorava pouco e não se sentia bem no colo.

O acompanha mento nutricional do bebê foi realizado intensivamente por sete dias, com a meta de ganho de 30 g ao dia, o que não ocorreu, chegando a uma média de 17 g/dia. A mãe, por conta própria, introduziu fórmula (90 ml de água e 3 medidas de fórmula por mamadeira). Após 17 dias, a criança já apresentava peso dentro do esperado para sua faixa etária.

O desenvolvimento prosseguiu normalmente, com acompanhamento de puericultura e vacinação. Todos os meses a mãe fazia registros fotográficos do bebê e observou que, após os seis meses, a criança parou de olhar para a câmera e interagir com os fotógrafos. Aos 8 meses, ela começou a andar, sem ter engatinhado. Nessa época, já balbuciava algumas palavras como "papai, mamãe, auau, vovó". Contudo, a mãe percebia um comportamento diferente: a criança não se manifestava quando tinha fome, não gostava de ser tocada ou pega no colo, brincava apenas com as rodinhas de um carrinho de boneca, enfileirava ou empilhava os brinquedos, gostava de dormir sozinha no quarto e não chamava ninguém ao acordar. Diante disso, a mãe levou a criança a uma neuropediatra, que a diagnosticou com TDAH.

Aos 1 ano de idade, a bebê parou de falar, começou a andar nas pontas dos pés e mostrou-se sensível a barulhos, multidões, texturas e cheiros. Não concordando com o diagnóstico inicial, a mãe procurou outro pediatra, que, após alguns testes, obteve um resultado sugestivo de TEA (Transtorno do Espectro Autista) e encaminhou a criança para uma neuropediatra especialista, a fim de fechar o diagnóstico.

Durante a consulta com a neuropediatra, foram solicitados os seguintes exames para análise diagnóstica: cariótipo com banda G, pesquisa molecular da Síndrome do X Frágil, teste do pezinho ampliado, hemograma, creatinina, ureia, gama GT, TGO, TGP, TSH, T4 livre, cálcio, magnésio, fósforo, potássio, sódio, cloretos e prolacti na.

Com os resultados em mãos, a mãe retornou para consulta, e a neuropediatra explicou que o exame de cariótipo com banda G apresentava o seguinte resultado:

- Número de células analisadas: 30
- Resolução: 400 bandas
- Cariótipo: 47,XXX
- Obs.: Em todas as células analisadas, foi visualizada a trissomia do cromossomo X.
- Valores de referência: Cariótipo masculino: 46,XY / Cariótipo feminino: 46,XX

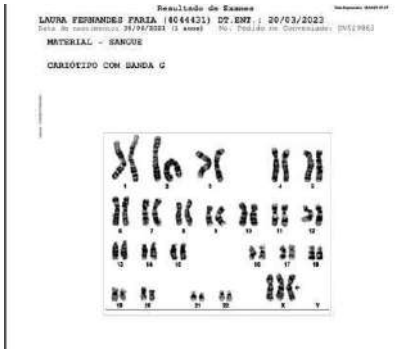

Figura 1: Resultado do Cariótipo com Banda G – Fonte: Arquivo Pessoal

Os demais exames estavam dentro da normalidade. Além disso, em uma entrevista com os pais sobre o histórico familiar, descobriu-se que uma prima de primeiro grau da criança tem TEA, e levantou-se a suspeita de que o pai apresentava traços do transtorno, confirmada posteriormente em outras consultas e testes. Com base nos testes, depoimentos, comportamento evidenciado em consulta e resultado do cariótipo com banda G, concluiu-se pelo diagnóstico de TEA.

A médica emitiu o laudo para a família e para a equipe multidisciplinar, para acompanhamento e estimulação da criança. Abaixo, o último laudo expedido pela profissional:

LUIZA PRATA

Paciente: Laura Fernandes Faria
Idade: 2
Data: segunda, 31 de julho de 2023

LAUDO MÉDICO:

PACIENTE LAURA FERNANDES FARIA, 2 ANOS, ESTÁ EM ACOMPANHAMENTO COM NEUROLOGIA PEDIÁTRICA DEVIDO A TRANSTORNO DO ESPECTRO AUTISTA NÍVEL DE SUPORTE 2.
EM INVESTIGAÇÃO ETIOLÓGICA, IDENTIFICADO TRIPLO X, COMORBIDADE GENÉTICA QUE PODE CURSAR EM ALGUNS CASOS COM TRANSTORNO DO ESPECTRO AUTISTA, ALTERAÇÕES GENITOURINÁRIAS , FALÊNCIA OVARIANA PRECOCE E DEFICIÊNCIA INTELECTUAL.
COMO CARACTERÍSTICAS AUTÍSTICAS: APRESENTA ATRASO DE FALA - HOJE JÁ EM EVOLUÇÃO, POUCA INTERAÇÃO SOCIAL, RIGIDEZ COGNITIVA, ESTEREOTIPIAS, ALÉM DE HISTÓRIA FAMILIAR POSITIVA PARA TEA.
SABENDO QUE AS INTERVENÇÕES COMPORTAMENTAIS E ESTIMULAÇÃO PRECOCE SÃO TERAPIAS COMPROVADAMENTE EFICAZES PARA O TRANSTORNO DO ESPECTRO AUTISTA, CRIANÇA DEVERÁ MANTER:
- TERAPIA OCUPACIONAL;
- FONOAUDIOLOGIA;
- PSICOLOGIA COM ORIENTAÇÃO PARENTAL (PREFERENCIALMENTE CIÊNCIA ABA)
- INCLUSÃO ESCOLAR COM MONITOR DE APOIO OU ACOMPANHANTE TERAPÊUTICO
- SEGUIMENTO REGULAR COM NEUROPEDIATRA.

O OBJETIVO É ALCANÇARMOS O MÁXIMO DAS POTENCIALIDADES E DESENVOLVIMENTO DA CRIANÇA.

LAURA É AINDA DEPENDENTE DE TERCEIROS PARA REALIZAÇÃO DE ATIVIDADES DE VIDA DIÁRIA E LOCOMOÇÃO.

MANTERÁ ACOMPANHAMENTO NEUROPEDIÁTRICO, SEM PREVISÃO DE ALTA.

ATT,

CID10: F84.0
CID11: 6A02.2

DIVINÓPOLIS, 31 DE JULHO DE 2023.

Assinado digitalmente em:
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Figura 2: Laudo da neuropediatra – Fonte: Arquivo Pessoal

Atualmente, com 2 anos e 4 meses, a menina mantém uma rotina de estimulações com equoterapia, fonoaudiologia, natação, psicologia, acompanhante terapêutica, terapia ocupacional e frequência escolar em período integral (recreação pela manhã e alfabetização à tarde), apresentando grande avanço no contato social e interação com outras crianças.

Além do autismo, a criança apresenta pé chato, aumento da largura da língua, excesso de sulcos linguais, hemangioma na região sacral e na glabela, e altura acima da média para a idade. Faz uso de Risperidona 1 mg/dl, sendo 0,2 ml pela manhã e 0,3 ml à noite.

IV. CONCLUSÃO

A conduta médica da segunda neuropediatra foi fundamental. Por meio dos exames solicitados, testes, observações e entrevistas, foi possível fechar o diagnóstico de Trissomia do Triplo X, sendo o TEA uma consequência dessa condição.

Com isso, iniciou-se o tratamento desde a primeira infância, proporcionando à criança melhores condições de vida.

Além disso, evidenciou-se a importância dos exames genéticos em diagnósticos até então pouco estudados, contribuindo para intervenções mais precoces e eficazes.

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Sapiens Three Essentials

Professor Andrew Hague

ABSTRACT

Homo Sapiens is the most dangerous species ever to live on earth. Compared to other animals, its communications skills are inferior being dependant on speaking but can record language which helps it to make tools most of which are weapons. These skills could be diverted to peaceful purposes. This article describes the behaviour of the species and shows how it can save itself from self-inflicted extinction.

Keywords: homo sapiens. species. violence. communication. microbiome. immune system. mind. cost. suffering.

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Keywords: homo sapiens. species. violence. communication. microbiome. immune system. mind. cost. suffering.

I. INTRODUCTION

Homo Sapiens is a new species and the most dangerous animal ever to live on planet earth. The prime predator kills both its own kind and destroys the habitat of other species for no benefit to any, itself or others. It is also the quickest multiplying species ever. When it emerged from its predecessors it lost the ability to communicate without language and had to learn to make tools. Only a few Sapiens now possess the ability to sense others' thoughts and the majority of the species considers these intuitives to be almost non-human. By necessity, language developed and with it, writing. This made innovation a communal exercise, not just an individual experimenting. Ideas were shared and expanded. Looking at what emerged, we see weapons rather than survival and comfort as the driver of thoughts.

This development of tools has got as far as trying to cure death. A search is on for longevity and permanent life[1]. As a backup insurance, claims are made for spending fortunes on space travel so that this dangerous animal can go and live on another uninhabitable planet in peace. As currently structured, Homo Sapiens is incapable of living peacefully. History proves this. I was born in the same year that Adolf Hitler committed suicide and American nuclear bombs stopped Japan's warmongering. Throughout history there has never been peace, there is always a war somewhere.

Curing death involves extending telomeres[2]. CellSonic has done this but whether it can make the extension infinite is doubtful. However, if it could, the result would be that Homo Sapiens becomes extinct. Whilst the aging population is stabilised, no newborns and no deaths, all other life around is evolving and gaining resistances to maintain health. Humans will not have that resistance because it can only be inherited and when the inevitable virus or bacteria emerges to which old humans have no resistance, the population will be wiped out before laboratories can concoct a cure. That was proven by the covid pandemic which produced only vaccines, not cures. However, CellSonic can cure that particular covid illness. Maybe it can do so for others still to emerge but it is not a certainty.

By chance rather than a plan, I find myself in the medical business and am entirely self-taught so there has been no brainwashing at a medical school manipulated by sponsors. I have had to work everything out from basic principles at my own expense. The power I now have is the ability to save lives and this contrasts with the power of others whose claim to power is the ability to kill. With that power, they will maintain peace.

It fascinates me that the nonsense of violence making peace is accepted. Most people are slaves. They are not free to think and do not try to think. They do not want to. All they want is a simple life and will do whatever is asked to be allowed to roll on without upset. The media has portrayed violence to an extent that it is used now for entertainment, not education. The oppressors are also victims. The waring leaders lack empathy. They have cunning, charisma and an ego telling

them they have a duty to lead and for that they have to dominate ruthlessly. Their personal satisfaction is at the cost of the rest of the population.

All these factors are failures of Homo Sapiens as a species. For a reason I do not understand, I am forever an optimist despite the facts directing my observations to doom. I see a better way forward. We shall not live forever nor should we but we shall each die peacefully and painlessly in our sleep. We have to be organised, not under threat but by motivation and understanding. Everyone is a winner and the thugs causing disturbance will be identified before it is too late to help them. This I shall explain as Sapiens Shield. Before that, let's look at the three essentials of Homo Sapiens for health. Then we can see the plan that will protect us forever and escape from illness, crime and war. The technology works, you want it and here is where we begin.

Homo Sapiens has three essential systems: microbiome, immune system and the mind. These will be explained and then Sapiens Shield. If one of the systems is not working, the other two will also fail and the person remains ill. They are interlinked.

II. MICROBIOME

This is the collection of inhabitants in our bodies that some biologists say entirely controls us. They are germs of all sorts, bacteria, viruses, parasites, etc. Without them we would not be able to function. They are energy converters. Food is digested into a useable form and waste expelled. We take in many germs by breathing as well as ingesting. Additionally, modern humans give themselves pharmaceuticals that are poisons in controlled quantities. These play havoc with the microbiome whilst the resident germs fight the newcomers into a truce.

There is unlimited advice on diet with less about the use of the body to burn the energy. What an Inuit eats in a land of snow would not suit a nomad in the Kalahari. The foods available are totally different and the body's requirements differ. One needs to generate warmth, the other to dissipate heat and both to be able to hunt for protein. Where shops supply food (a quarter of the world's population now lives in cities of more than a million inhabitants), customers will be offered easy to cook ingredients which do not necessarily contain all the necessary nutrients and vitamins. The legacy of traditional and seasonal eating is lost in the industrialisation of farming and processing. The microbiome may complain by failing to maintain its host leaving illness that never goes away.

When the body is exerted daily as our predecessors did hunting and scavenging, there was a swing from famine to feast with tolerance of experimental vegetation if preferences were not to be found. Homo Sapiens remain convinced that there will be a famine tomorrow so they never fail to stock up on more than they need for the day. The species has not further evolved to sit down all day and eat only enough to pump light heart beats. Brain activity was never the main energy drain for ancestors but for many today it is. Driving a car is constantly creating tensions, demanding decisions and provoking aggression. The brain deals with this as it evolved to do when the person was fighting and supply the oxygen to drive muscles. Unfortunately, the sedentary car driver is hardly moving muscle. The unused fuel is stored because threats are still expected, such is the innate programme inherited 80,000 years ago. The result is an unhealthy body. Either fish through a hole in the ice or chase a gazelle across the dunes. If that is not convenient, stick to organic fresh fruit, vegetables and meat if meat suits you. There has to be a balance of nutrients, essential vitamins and only enough carbohydrate for the day. Tomorrow you can easily go shopping. The shift to a cash economy is for some people harder than hunting and gathering in the wild. Never have alcohol, drugs, tobacco or vaporisations. Anything that disturbs the brain causes damage to the microbiome.

Pharmaceuticals are only to be taken as a last resort if nothing else works. Usually, the combination of exercise and a balanced diet is the key to health.

III. IMMUNE SYSTEM

The immune system checks and repairs us. Homo Sapiens need it because they have unstable organs. They are new, appearing only 80,000 years ago with body cells replicating on average about every six weeks. Ants and sharks that have existed for millions of years do not replicate their body cells as Homo Sapiens do[3]. With this cell replacement, some new cells may not be exact reproductions of what was there before so they are different, mutations, and start to replicate profusely which is cancer. At night, sleeping properly, the immune system finds the faulty cells, kills them and the body starts afresh the next morning.

If there is an injury whilst hunting, the immune system heals the wound. There is a threshold of pain set to allow the hunter to persist. Modern lifestyles seldom encounter these demands for persistence. The species has invented labour saving devices. Muscles are not used and wither especially amongst retired, older people. The concept of retirement was never considered when the species evolved. CellSonic promotes wound healing by breaching the threshold without causing pain and triggers the immune system into action. The blood directed to the injury contains the right platelets, blood cells and stem cells for new tissue, there is more oxygen and nitric oxide in the blood to kill infections. Early ancestors did not need CellSonic, nor did they have the technology or electricity to operate the machines. Modern survivors depend on the biophysics of CellSonic because their lifestyle is inadequate for their wellbeing.

The immune system needs vitamin D from sunlight. Synthetic versions are less effective. Covering the skin unnecessarily restricts sunlight. Beware of creams and make-up blocking the skin. Wearing darkened sun glasses prevents the skin from knowing that it has to protect itself from the ultraviolet light rays. Remember that our ancestors did not have sunglasses or suncreams. Their skin acclimatised to the weather where they lived and their life was all outdoors. The conditions in Australia and New Zealand have become difficult because the ozone layer is not filtering the UV rays which can burn more quickly than in the northern hemisphere.

Sleep is essential to the immune system. During sleep, the immune system diagnoses and cures. It deploys the resources of the microbiome and is effective according to the wishes of the mind. Prolonged, disturbed sleep always results in illness.

IV. THE MIND

Now that we have computers we can liken the brain to hardware and the mind to software. This explanation would have been impossible years ago but you, dear reader, will understand. The mind is a programme and if a person has the wrong programme they will never be healthy. Basically, it is the temperament or state of mind. To be pleasant, sociable and smiling is healthy and to be sour, grumpy and pessimistic is unhealthy. These are self-fulfilling circles. A happy person promotes happiness and an unhappy person is surrounded by foreboding.

With a well-balanced microbiome and an immune system operating as it should, the mind should be positive. If either of the other two systems fail, the mind has to make the correction. It is the controller whilst at the same time it is subject to the support or restrictions imposed by the related systems.

This relationship has become clear to all CellSonic operators especially when they are treating cancer. The machine always lifts the cell voltage to 75 mv during the treatment, a time of less than two minutes. This 100% success rate is maintained by a positive outlook. Should the patient be negative, the cell voltage falls to 10mv where cell replication become profuse with the cells multiplying and migrating.

The usual cause of anxiety is relationships and often within a family.[5] Outside the family, a person can move, change job, for example, but being trapped by ties such as parenthood and marriage can be destructive. Other frequent causes are chemical pollutants invading the microbiome, electrical fields from smartphones and transmission towers and societal pressures in

which teachers forever criticise students. Even the best in class is told to try harder. Like the threat of violence intendent to instil peace, teachers motivate with threats rather than praise. Making a child the best in a class of 30 gives that child 29 dislikes. Harmony has been lost since Homo Sapiens walked out of the Great Rift Valley. Mockery appears to be unique to Homo Sapiens and not observed in other species.

If Humans Were Robots There Would Be A Product Recall

Hey, Guv! Those humans we programmed in the Rift Vally on Earth are ruining everything, their planet and themselves.

Is Earth that little one where you experimented with life and gave it water and electrical forces?

Yes, it was working nicely and I thought you might try it in other galaxies.

I am too busy with the universe, got it expanding nicely. You should have stuck to minerals and gravity. That's enough to keep planets spinning. Experiments only cause disruption. You had to press the reset when the dinosaurs became too big and you smashed an asteroid into it. Are you going to have to do that again?

Maybe not. The humans may cause their own destruction and remove all life on Earth at the same time. They are re-programming themselves.

V. SAPIENS SHIELD

This is a plan. There are three branches of medicine: biochemistry, biophysics and psychology. Psychology has names for everything and cures for nothing. Biochemistry has only three products: vaccines, anti-biotics and anaesthetics. Biophysics recognises the electrical properties of the body and cures chronic disease. CellSonic is biophysics in one package. The skills to use it are not taught at medical school where the focus is on surgery and pharmaceuticals. Moreover, those who qualify for medical school are often unsuited to work with CellSonic because they lack intuition and empathy. To gain entry to a medical school you have to show the ability to memorise. The desire to help others is ignored and seldom as important to the student as getting a well-paid job and status. Medical graduates mistakenly believe they know everything and are superior. Since the Wuhan laboratory let the covid virus injected into pangolins be sold at the wet market,[4] a scandal covered up by the WHO and governments, respect for the medical establishment has been falling. People are waking up and refusing to be coerced. If the species has survived for 80,000 years without factory made drugs, they can go back to what has worked before and know that the herbal medicines are safe.

Better to gather the knowledge of what is beneficial and what is poisonous before it is lost. There are still some who can pick mushrooms.

Chronic disease develops in the body gradually. It can be detected before a person knows they have it. The Sapiens Shield plan is based on a diagnose and cure being done in 20 minutes thus allowing 8,000 people at one clinic to be checked and cured in six months. By checking everyone in the world twice a year at a million clinics, no one will develop a chronic disease and this includes cancer, a killer disease that can be stopped forever.

There are three categories being checked: those with nothing wrong, those who know they have a problem and those who are unaware of a problem. Those with a problem are treated and there may be more than one treatment required. The early onset of low voltage can be corrected and these people, oblivious to their cell condition, are referred to the next step of the plan. They are directed to another room where a smiling person greets them and can see from a mark on a card that this person had cancer a few minutes ago. From that evidence and by intuition, this friendly person knows that they are in a dysfunctional family. Let the person talk. They want to talk. The main problem is that no one will listen or help. Whereas the diagnose and cure took 20 minutes, the conversation with the intuitive[6] will go on for an hour or more. It will not be rushed and there will be an offer to help. The disturbances facing the rescued person go beyond health. They affect social cohesion and economic survival. In other words, crime begins in a family or the lack of a

loving family. No one is born a criminal. Prisons and the police are useless because they do not find the problem until after the crime and they do not rehabilitate. Sapiens Shield finds the problem. The person's health can be treated and the community organised to offer support. The health is the easy part. With Sapiens Shield[7], healthcare costs would tumble giving huge savings of money and suffering. The CellSonic machine has what is needed to correct the person by applying electrolysis, voltage correction and infection killing. This is done in one or two minutes. Helping a dysfunctional family could take one or two generations. How did that person get into the wrong relationship? Because they never knew from their upbringing what a good relationship is. Why did they not know this? Because their parents got it wrong and so it goes back generations where mistakes breed mistakes. It is a cost to society and is intrinsic in the species to let violence dominate all other responses to stress.

Crime at the Top

The Wuhan crime is only part of the whole story which goes back to Rockefeller and continues today. As I write, the USA has resigned from the World Health Organisation. Change is coming. Watch the video by Dr David E Martin.[8] He presents facts.

VI. CONCLUSION

Sapiens Shield can break that cycle of violence by healing without side effects and deploying caring, intuitives to advise. At last, the tool making ability shifts from weapons to life saving. Let the mentally scarred, charismatic egotists see a role for themselves as saviours, not conquerors.

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Research on Procrastination During Exams, Mental Health Care, ADHD, and its Prevention

Xavier Munda, Dr. V Thangavel & Vijay G.

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ABSTRACT

When students put off preparing for an exam despite knowing they have a deadline and should do so, this is known as procrastination by examination. Students who are anxious about failing the test may put things off. They may put off doing it if they are having trouble understanding the topic. Students who have bad study habits may put off tasks. Depression, anxiety, low self-esteem, and ADHD (Attention Deficit Hyperactivity Disorder) have all been related to procrastination. A neurological condition known as ADHD can impact both adults and children. Hyperactive tendencies, difficulty focusing on activities, and an inability to regulate impulses are all possible symptoms of ADHD2. The disease does, however, also have several advantages and strengths.

Keywords: procrastination, examination, mental health care, attention deficit hyperactivity disorder ADHD, action control, intention, prevention, mental and physical stress. ICSE.

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Keywords: procrastination, examination, mental health care, attention deficit hyperactivity disorder ADHD, action control, intention, prevention, mental and physical stress. ICSE.

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I. INTRODUCTION

Procrastination may be overcome to lead a happy and productive life. Students who purposefully put off studying or getting ready for tests until the last minute are said to be engaging in "exam procrastination," which can result in stress, subpar work, and possible academic failures because they won't have enough time to fully understand the content. Burka & Yuen (1983[16]), Milgram, Sroloff, & Rosenbaum (1988[17]) Van Eerde, (2003[18]) revealed that "procrastination can even be distinguished from the intentional postponement of a task because procrastination is unplanned or from logical and necessary delay, due to understandable reasons such as illness or technical problems[20]". Academic procrastination, which can be called a reflection of daily postponement to school life, is defined as delaying duties and responsibilities related to school or saving them to the last minute (Haycock, McCarthy, & Skay, 1998[19]).

II. LITERATURE REVIEW

According to studies conducted in Canada, China, the United States, Europe, Asia, and North America, academic procrastination-defined as delaying or postponing academic tasks despite knowledge of its detrimental effects-is "a widespread issue among students worldwide" (Steel 2007[4]. Klassen et al., 2011[5]; Sirois & Pychyl, 2013[6]). Students and teachers are impacted by a range of behaviours, including social media diversions and thesis delays (Svartdal, Dahl, Gamst-Klaussen, Koppenborg, & Klingsieck, 2022)[7]. This includes behaviours such as avoiding studying by engaging in other activities like cleaning (Van Eerde, 2000[8]), spending excessive amounts of time on other activities before beginning schoolwork (Pychyl, Morin, & Salmon, 2000[9]), and experiencing major project delays (Svartdal, Aamodt, & Schou-Bronstein, 2022[10]). Moreover, procrastination among academic professionals is occasionally referred to as "academic procrastination," however this is controversial. According to Patrzek, Grunschel, and Fries (2012[11]), it might be more reasonable to classify teachers' or faculty members' excessive delays in lesson preparation or grant application draughting as occupational procrastination. Clarry H lay et all 1989[12] in their study conclusions suggest that other factors, such as educational attainment and psychological issues, may be at play and that various tools are not reliable indicators of procrastination levels. We can infer that while ICT is a contemporary tool to help students with their writing, it does not lessen the negative impacts of procrastination on pupils compared to older testing techniques, Seyyede 2021[13].

III. RESEARCH DESIGN

This study's necessity stems from the findings of researchers, who suggested that more research is needed to examine how ICSE School pupils in Mumbai Suburban, Maharashtra state, procrastinate on exams and their academic pursuits. Finding out about student exams and associated procrastination is necessary for this study to help students write exams without worry, anxiety, or tension. To help different educational institutions prevent exam procrastination, the researcher investigates exam-related procrastination, adopts appropriate data analytical procedures, and finds trends that follow. This study specifically looked at data on exam procrastination[29] in their ICSE board exams, including task completion and completing the Higher Secondary Certificate, which aids in their attempt to enroll in undergraduate courses at universities. Additionally, this study looks for distinct patterns in the time it takes to complete tasks, scores, gender, and academic level as the test goes on.

IV. METHODOLOGY

The survey questionnaire method has been employed to collect the data for the present study. The questionnaire was constructed based on the following elements: personnel profile, frequency of Study, the purpose of study, acceptance of writing exam or test, awareness of the existence of procrastination, publicity to promote the psychological and psychological training, test paper answering methods, Time management, Avoid fears. Deploying good habits, counselling by psychological experts, formal counselling centres deployed by the state government, national counselling centres, free toll-free centres for students, etc. The area of research is in the Mumbai sub-urban area of Maharashtra state. The investigators selected ICSE board schools in the educational jurisdictions of Mumbai's sub-urban. The Joint Director of Higher Education (JDHE) Mumbai office is the regional office for Mumbai and its suburbs. The JDHE's responsibilities include coordinating and controlling government colleges and institutions and acting as a bridge between the Ministry of Higher & Technical Education and the universities and colleges in the region. In 2024-2025, the researchers distributed 1400 Questionnaires to the 12 ICSE Board Schools. From these 12 schools' 624 students, 227 teachers,228 parents, and 232 guardians were replied. In the questionnaire survey out of 1400 respondents, 93.64% of respondents replied.

V. DATA ANALYSIS

5.1 Distribution of Questionnaires

From Table 1, we easily identify the respondent's replies as classified below. Research analysis survey adopted by direct questionnaire methods. Out of 1400 Questionnaires were delivered to the respondents. 1311 respondents replied. Based on their replies the respondents are classified based on categories of students, parents, teachers, and guardians, data analysis has been processed. The majority of the respondents are female. Overall, the respondents replied that students 47.59%, Teachers 17.31%, Parents 17.39% and guardians 17.69%. This research reflects that many of the respondents are students 624 (47.59%).

Tab. 1: Total Number of Respondents

Respondents	
Male	Female
556	755
Total	1311

Tab. 2: Distribution of Questionnaire and Sex-wise Respondents Classification

Students		Parents		Teachers		Guardian	
M	F	M	F	M	F	M	F
302	322	89	139	82	145	83	149
624		228		227		232	
Total						1311/1400	

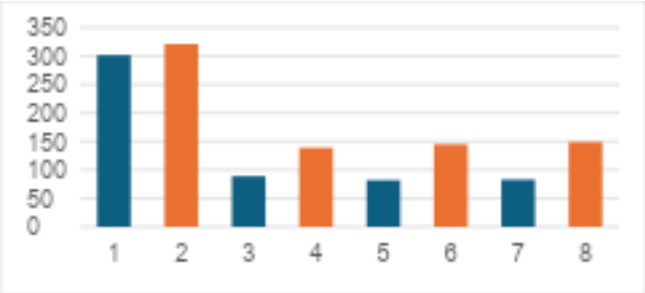

Fig. 1: Total Number of Respondents

5.2 Factors Influencing Area of Academic Procrastination

In tables three and four the data reveals the factors influencing the area of academic procrastination. Procrastination indicators are classified in various styles from constant to extracurricular activity. The majority of students procrastinate to study for examination purposes, which is 78.26%. comparing to writing assignments is 70.56%. the least number of students agreed to procrastinate through co-curricular activities 6.25% and many of the respondents are not responding to co-curricular activities 56.60%.

Tab. 3: Area of Academic Procrastination Influencing Factors

S. No.	Procrastination Indicators	Agree	Un-Decided	Disagree	No Response
1	Constant	733	46	132	400
2	Writing assignment	925	24	86	276
3	Presentation	894	95	217	105
4	Study for Examination	1026	56	44	185
5	Group Work	753	15	90	453
6	Academic activity	761	251	163	136
7	Library work	320	483	110	398
8	Co-Curricular Activities	82	235	252	742
9	Extra-Curricular Activity	43	117	639	512

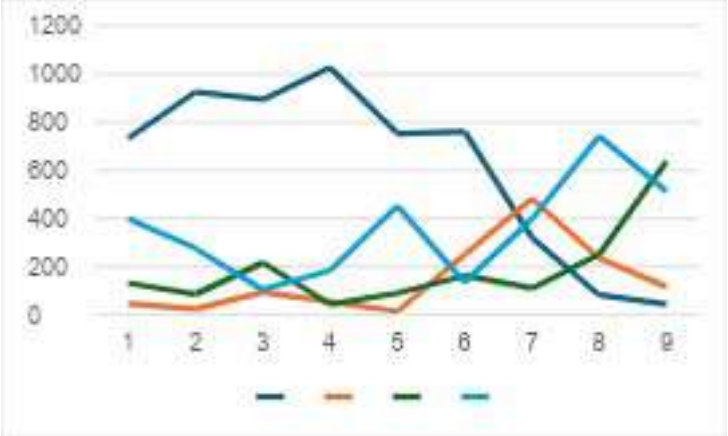

Fig. 2: Factors Influencing Factors Academic Procrastination

Tab. 4: Area of Academic Procrastination Influencing Factors

S. No.	Procrastination Indicators	A	B	C	D
1	Constant	55.91%	3.51%	10.06%	30.52%
2	Writing assignment	70.56%	1.84%	6.55%	21.05%
3	Presentation	68.19%	7.24%	16.56%	8.01%
4	Study for Examination	78.26%	4.27%	3.35%	14.12%
5	Group Work	57.43%	1.15%	6.86%	34.56%
6	Academic activity	58.04%	19.14%	12.45%	10.37%
7	Library work	24.41%	36.84%	8.40%	30.35%
8	Co-Curricular Activities	6.25%	17.93%	19.22%	56.60%
9	Extra-Curricular Activity	3.27%	8.92%	48.75%	39.06%

5.3 Factors Influencing Exam Procrastination

Procrastination influences are influenced by examination classified in 11 factors. From these majority of them procrastinated because of fear of failure 95.05%, 72.69% of them anxiety, and pressure 70.26%. Factors influencing exams are mainly fear of failure and anxiety. Test anxiety is defined as an emotional reaction[26] or a state of stress that occurs before examinations and continues throughout the examination period[25]. Tables five and six are the evidence of examination procrastinated by the respondents.

Tab. 5: Exam Procrastination Influencing Factors

S. No.	Exam Procrastination Indicators	A	B	C
1	Anxiety	72.69%	21.66%	5.65%
2	Fear of failure	95.05%	3.96%	0.99%
3	Poor time management	60.86%	19.38%	19.76%
4	Lack of Motivation	45.92%	30.21%	23.87%
5	Self-regulation difficulties	35.62%	26.54%	37.84%
6	Task Aversiveness	38.90%	48.21%	12.89%
7	Fear of social disapproval	66.82%	15.18%	18%
8	Aime of the Study	45.15%	35.93%	18.92%
9	Pressure	70.26%	18.07%	11.67%
10	Temptation and distractions	41.18%	26.31%	32.46%
11	Others	23.34%	38.82%	37.84%

Tab. 6: Respondents Replied about Exam Procrastination Influencing Factors

S. No.	Exam Procrastination Indicators	Agree	Un-Decided	Disagree
1	Anxiety	953	284	74
2	Fear of failure	1246	52	13
3	Poor time management	798	254	259
4	Lack of Motivation	602	396	313
5	Self-regulation difficulties	467	348	496
6	Task Aversiveness	510	632	169
7	Fear of social disapproval	876	199	236
8	Aime of the Study	592	471	248
9	Pressure	921	237	153
10	Temptation and distractions	540	345	426
11	Others	306	509	496

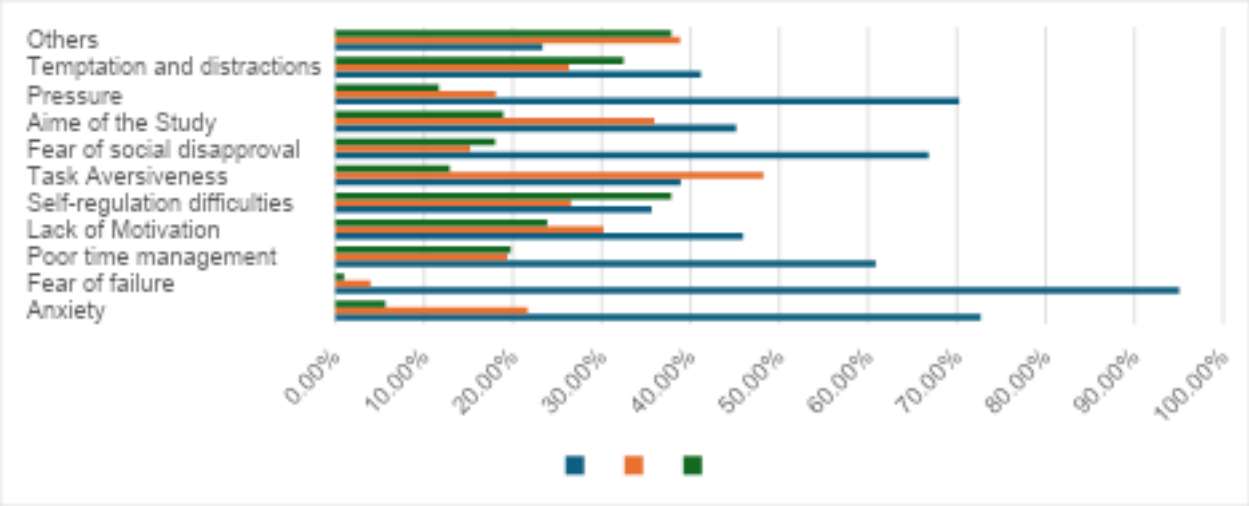

Fig. 3: Factors Influencing Exam Procrastination

5.4 Procrastination Indicators among Pupils Performing at Varying Levels Related to Academic Records

The students' yearly academic records are also considered as the procrastination indicators among pupils' performance at various levels and their performances in Table Seven. 74.21% of them procrastinated by academic pressure, secondly 65.51% of them were affected by behavioural assessment, and third places were taken by conflict is 58.35%. Many of the respondents are not interested in giving their responses to changing schools, and 1.61% disagree with pressure procrastinated factors.

Tab. 7: Procrastination Related to Academic Records

S. No.	Procrastination Indicators	Agree	Un-Decided	Disagree	No Responses
1	Behavioural assessment	854 (65.15)	257 (19.60)	97 (7.39)	103 (7.86)
2	Change	732 (55.83)	94 (7.17)	26 (1.99)	459 (35.01)
3	Cognitive assessment	594 (45.31)	212 (16.17)	259 (19.75)	246 (18.77)
4	Conflict	765 (58.35)	89 (6.80)	215 (16.40)	242 (18.45)
5	Emotional assessment	632 (48.20)	156 (11.91)	128 (9.77)	395 (30.12)
6	Frustration	420 (32.04)	257 (19.61)	176 (13.42)	458 (34.93)
7	Intrusion	571 (43.55)	256 (19.52)	62 (4.72)	422 (32.18)
8	Physiological assessment	516 (39.36)	265 (20.21)	97 (7.41)	433 (33.02)
9	Pressure	973 (74.21)	69 (5.26)	21 (1.61)	248 (18.92)

5.5 Procrastination Indicators among Pupils Performing at Varying Levels Related to Academic Performance

Table eight reflects the academic performance based on their study behaviors. The majority of them avoidance of failure is 72.31%, 69.26% are affected by social anxiety and 70.49% of them have laziness in academic activities.

Tab. 8: Procrastination Related to Academic Performance

S. No.	Procrastination Indicators	Agree	Un-Decided	Disagree	No Responses
1	Avoidance of failure	948 (72.31)	112 (8.54)	86 (6.55)	165 (12.58)
2	Challenge	891 (67.97)	15 (1.14)	111 (8.47)	294 (22.42)
3	Frequency of procrastination	796 (60.71)	237 (18.07)	26 (1.98)	252 (19.22)
4	Impulsivity	439 (33.48)	298 (22.73)	37(2.82)	537 (40.97)
5	Laziness	924 (70.49)	264 (20.13)	16 (1.22)	107 (8.16)
6	Organization	592 (45.15)	217 (16.56)	113 (8.61)	389 (29.68)
7	Poor perfectionism	565 (43.11)	293 (22.34)	15 (1.14)	438 (33.41)
8	Self-control	712 (54.31)	329 (25.10)	56 (4.27)	214 (16.32)
9	Social anxiety	908 (69.26)	179 (13.65)	32 (2.45)	192 (14.64)

5.6 Procrastination Indicators among Pupils Performing at Varying Levels Related to Social Anxiety

Social anxiety indicators are classified as 15 factors, these 75.51% of them procrastinated by parental pressure, and 65.29% got academic pressure from their work. The least number of them are indicated by social interaction.

Tab. 9: Procrastination Related to Social Anxiety

S. No.	Procrastination Indicators	Agree	Un-Decided	Disagree	No Responses
1	Academic Pressure	856 (65.29)	55 (4.20)	79 (6.02)	321 (24.49)
2	Adapting to a new environment	309 (23.57)	694 (52.94)	49 (3.73)	259 (19.76)
3	Conflict	581 (44.31)	205 (15.63)	73 (5.58)	452 (34.48)
4	Ego-is-tic	473 (36.08)	316 (24.10)	138 (10.52)	384 (29.30)
5	Emotional assessment	628 (47.91)	382 (29.13)	65 (4.96)	236 (18)
6	Frustration	495 (37.75)	245 (18.69)	153 (11.67)	418 (31.89)
7	Parental Pressure	990 (75.51)	42 (3.21)	82 (6.26)	197 (15.02)
8	Physiological assessment	641 (48.90)	270 (20.59)	36 (2.74)	364 (27.77)
9	Psychological Anxiety	504 (38.45)	107 (8.16)	71 (5.41)	629 (47.98)
10	Rational Thinking	633 (48.29)	77 (5.87)	219 (16.71)	382 (29.13)
11	Social Interaction	247 (18.84)	192 (14.65)	149 (11.36)	723 (55.15)
12	Socio-Cultural Pressure	572 (43.63)	391 (29.82)	47 (3.59)	301 (22.96)
13	Societal Pressure	364 (27.76)	311 (23.72)	90 (6.87)	546 (41.65)
14	Social Shyness	456 (34.78)	294 (22.43)	28 (2.14)	533 (40.65)
15	Social Skill	592 (45.15)	482 (36.77)	72 (5.50)	165 (12.58)

5.7 Hypothesis Formation and Findings

A hypothesis test ought to be conducted to ascertain whether a statistically significant correlation exists between the independent and dependent variables. The following hypothesis has been framed based on the data analysis by statistical tools.

H_1: Most procrastinators see their delaying behaviors as inappropriate, problematic, and in need of change[24].

H_2: In academic contexts, procrastination occurs for tasks such as learning for an examination or writing an essay[23].

H_3: Procrastination has a favorable correlation with social anxiety. According to the findings, people with higher levels of social anxiety put things off more. One explanation could be that people postpone avoiding unpleasant situations or uncomfortable states, as well as when they are afraid of failing or receiving a low grade. People with greater levels of social anxiety may try to put off duties that need them to connect with others because they are afraid of being poorly evaluated, falling short of expectations, and receiving rejection.

H_4: Academic procrastination was predicted to be linked to worse paper grades, lower grades in writing-intensive courses, anxiety about writing a big paper, delayed behaviors on the writing assignment, and reduced pleasure with the writing experience of various exams.

H_5: Based on academic records, before turning in their work for grading, high academic procrastinators were predicted to be less likely to ask for feedback. However, it was anticipated that receiving writing feedback would mitigate the association between individual differences in academic procrastination tendency and outcomes. This means that individuals who report a high procrastination tendency would benefit more from receiving feedback than those who report a low procrastination tendency.

H_6: Procrastination can lead to the development of new unpleasant feelings including guilt, humiliation, and frustration. Numerous other problems, including elevated stress, heightened interpersonal disputes, and goal failure, can result from procrastination. So, for academic failure, 72.31% also have an evidential record which may cause problems for students who have academic problems.

H_7: The association between test anxiety and its aspects and negligence was examined using Pearson's correlation test. According to the findings, procrastination and test anxiety were significantly correlated ($P < 0.01$). In social anxiety, Parental pressure is 75.51% so, the hypothesis is signified. The procrastination indicators are involved in school ICSE school students through this survey[28].

VI. DISCUSSION

Procrastination has psychological causes, according to studies, although the impact of environmental and situational factors has been thoroughly studied. In this study, writing was tested using two distinct instruments and in two distinct scenarios. While the other group employed paper and pen tools, the testing group used to compose essays, objective-type questions, and answers, etc. as a testing tool. From a total of 100 students enrolled in the two institutions after the pilot study to reframing the questionnaire delivered to St. Francis ICSE School and Assisi Institution, 96% of respondents were replayed.

Through this survey, the researcher selected Mumbai suburban region ICSE affiliated schools in the Dahisar area of Borivali. 1400 Questionnaire delivered directly to the respective school based on students, teachers, parents, and guardians. Out of 1400 respondents, 1311 respondents were replied (93.64%). Based on their responses majority of the students are female 51.60% and male 48.39%. The respondents from teachers are 63.87% and male 36.12%. The parental respondents are segregated as parents 17.39% and guardians 17.69%. Overall, the respondents replied that students 47.59%, Teachers 17.31%, Parents 17.39% and guardians 17.69%. This research reflects that the majority of the respondents are students 624 (47.59%). Furthermore, there was a strong correlation between test anxiety and its dimensions and gender in terms of cognitive error and overall test anxiety, but not between procrastination and gender. Studies have indicated that women are more likely to suffer from higher levels of exam anxiety[27].

Seyyed and their investigation in online tests by ICT tool was adopted in German. A Likert scale was used to score the participants' responses to the 20-question standard procrastination test by Lay (1986). No significant difference was seen between the procrastination levels of the two testing groups and their findings ($p<0.5$) Seyyede 2021[13], Clary et al (1989)[12]. Sub, A., & Prabha, C. (2003)[14] In this study, they looked at how high school boys and girls (N=200) interacted with

perfectionism, test procrastination, and test anxiety (and its worry and emotionality) components in connection to their academic achievement. From the previous year's school data, the total of the annual academic scores was calculated. Academic performance was found to be strongly and negatively correlated with self-oriented perfectionism, procrastination, exam anxiety, worry, and emotionality, according to correlational analysis. The most useful factors in this regard were found to be test anxiety and procrastination. Endler 1997[15] examined the interaction model of anxiety in a test setting.

Before a crucial psychology test, 56 under graduates recorded their pulse rates and answered the self-report Behavioural Reactions Questionnaire (BRQ), which is a gauge of A-state. Two weeks later, in non-stressful circumstances, Ss once more finished the BRQ and took a heart rate reading. They also finished the S–R Inventory of General Trait Anxiousness (S–R GTA), which is a test of A-trait. The interaction model of anxiety's differential hypothesis predicted that the ego-threatening situation (exam) and interpersonal (ego-threatening) A-trait (high vs. low) would significantly affect A-state arousal. However, there was no significant interaction between the threatening exam situation and the other aspects of A-trait (physical danger, ambiguous, and innocuous). 1,629 online exam records over a five-term span at a southeastern US academic institution were included in the dataset. Students were required to complete the online tests, which were available for a week, using the content they had learned the week before. For every extracted record, the task performance window and time were set. According to the study's findings, more than half of students (58%) procrastinate on online tests, while the remaining 42% plan their work to prevent procrastination. But compared to those who staged their work, those who procrastinated seemed to perform noticeably worse. Additionally, distinct patterns were noted according to the students' gender, academic level, and whether they took the tests in the morning or the evening.

The study's findings allowed researchers to identify different levels of procrastination that could result in poorer scores on board exams. Students' anxiety levels regarding writing exams, tests, schoolwork, pressure, assignments, psychological and physical exercises, and other related programs were found to vary, according to the survey. Since most of the research from various studies conducted in different countries has focused on academic procrastination, it can help everyone address exam-related procrastination at different levels so that they can attend different exams, both online and offline, administered by different boards in different regions at different grade levels (2023)[22].

VII. RECOMMENDATION

7.1 Preventions For Exam Procrastination

Time Management: Effective time management and organization are crucial while studying several subjects. This is because you want to finish all your study material before the final exam. 1. Make a list of all the subjects you need to study for the test and make a strategy. 2. Give each topic a specific amount of time and set little goals for yourself along the way so you can stay motivated and track your progress. It's better to divide up your studies than to do it all at once. 3. This will maintain everything in your memory when you take the test and lessen the likelihood that you will forget it. 4. Additionally, you should allow time to review the most crucial points so that you are prepared to receive the highest possible mark (2022)[1]

Try to keep your phone far away from you: Even while we all adore our phones, they can be a major hindrance to our ability to study for tests: 1. A single glance at social media can soon escalate into a whole evening of putting things off. When studying, we advise putting your phone away to prevent this from happening to you. 2. To prevent overuse, you should establish time limitations for each app if you wish to use your phone as a reward during study breaks. 3. To help you focus on studying, you can also download browser extensions or programs that restrict how much time you spend on non-academic or social media websites.

Utilize the Interval of interim periods: It might be challenging to even find the time to study if you have a full day at school or must juggle part-time work. 1. It is up to you to figure out when you can get in a few minutes of revising throughout the little breaks in your day. 2. Waiting for the bus to university or for your next class to start are two situations where you may simply put on your headphones and listen to some study material. 3. You will avoid the stress of last-minute revisions and see a significant improvement with any modification you can complete.

Remember to take rests or breaks: You cannot work for hours on end and expect to be productive the entire time; you must plan breaks for yourself so that your mind can rest. 1. Before their brains shut down, most people can only concentrate for 25 to 30 minutes. So, divide your study time into manageable chunks of 30 minutes each, and then take a 15-minute break. 2. When taking breaks, you should move from your desk, eat or drink something, and spend a few minutes doing anything that will allow your mind to relax before returning to work.

Dissect the deadline: When you consider all the preparation you must do before a significant test, it can be intimidating. However, there's no need to worry; you may simply divide your work into manageable chunks.1. Establish manageable objectives for yourself. For instance, you may make it your goal to revise five chapters per week. 2. You'll feel more driven and effective after completing these little objectives, which will help you reach your next one.

Maintain an active lifestyle between continued revision sessions: Spending all day at your desk might wear you out and deplete your energy. When you can, get your body moving and your blood circulating in between revising sessions. If you would like, stay inside and do some stretches or go for a jog or walk around your neighbourhood. Maintaining your physical health is crucial for maintaining your mental clarity and emotional stability.

Make a graphic and visual representation of every task you must complete: Having everything in your thoughts can make it difficult to remember what you need to do. Everyone should have a visual picture of all the duties they have to finish, according to our recommendation. It is very helpful to have something visible in front of you, whether you use a study journal on your phone or post-op notes placed throughout your room to keep track of everything.

Crucial to switch up the scenery: Even if you have the ideal study space, sitting in the same area every day can make it difficult to maintain motivation. To be productive, try to switch up your location occasionally. Making a change in your surroundings will benefit you, whether you want to go to your favourite park, the local library, or a coffee shop.

You should be rewarded for your efforts: Maintain your motivation and prevent burnout by striking a balance between work and enjoyable pursuits. You deserve a reward for all the hours you're putting in if you're working hard to achieve the grades you desire. Rewarding yourself is a good idea after working for a few hours or reaching a goal. This could be going out to dinner, getting a coffee from your favourite coffee shop, or simply using Netflix to watch a new movie.

Invite your pals or friends to join you for your upcoming study session: Doing your studies alone isn't always necessary. To do assignments together, plan a study session with friends who are preparing for the same course as you. You may stay focused by spending time with other individuals who are studying, even if your buddies are not in the same class as you.

7.2 Prevention For Adhd Procrastination

Procrastination is a common behaviour that can be related to ADHD, but it's not a direct symptom of the condition (2023)[3].

ADHD symptoms: People with ADHD may have trouble paying attention, planning, and organizing. These symptoms can lead to procrastination.

Fear of failure: People with ADHD may procrastinate because they're afraid of making mistakes or not doing a task well.

Perfectionism: People with ADHD may procrastinate because they're afraid their work won't meet their high standards.

Task initiation: People with ADHD may have trouble starting tasks, which can be misperceived as procrastination.

Hyperfocus: Some people with ADHD have hyperfocus, which can help them get things done quickly.

Treatment:

Psychotherapy: Psychotherapy can help people with ADHD manage procrastination.

Medications: Stimulant medications like buproprion, guanfacine, or clonidine can help with ADHD symptoms.

Occupational therapy: Occupational therapy can help people with ADHD manage procrastination.

Impact: Procrastination can lead to poor time management, which can impact relationships and work performance. 2. Procrastination can also lead to stress, disappointment, and conflict.

7.3 Prevention for Academic Stress

Utilize Campus Resources: The Centre for Academic Resources (CFAR) offers study mentorship, time management groups, study skills groups, and drop-in study groups. Office hours are available and publicized. There are study and lab groups for TAs. Some instructors share their notes online. At PACS, some groups deal with issues including social anxiety, depression, and anxiety. When things get too hectic or stressful, PACS offers same-day appointments and urgent treatment, as well as counsellors available to assist you[21].

Remain in the Present: the past is over, and the future has not yet arrived. The current moment is the one that you have complete control over. Gently bring your mind back to the present when you become aware that it has strayed to the past or the future.

Develop New Skills by Practice: Since we are only human, we will inevitably make mistakes. You have an opportunity to learn about yourself every time you make a mistake. Practice is the key to learning a new skill. Practice is essential if you want to become a better singer, learn to play an instrument, become a gourmet chef, or get better at sports. You will feel better the more you adopt healthy thought and behavior patterns. You will be better prepared for the test or to write the paper if you adopt effective time management and study techniques (2025)[30].

Choose Positive Self-Talk: Your self-perception is influenced by the words you choose to describe yourself. If you "belittle yourself" and "beat yourself up," you may begin to believe that voice inside of you. Instead, if you learn to "give yourself a break" or be a "supporter of yourself," you'll feel more optimistic, have more energy to accomplish things, and have a higher chance of reaching your full potential. Take note of your ideas as the day goes on. Are they nervous? No? Critical of oneself? If that's the case, you can decide to ignore them and let them drift away. It is possible to practice substituting constructive and motivating thoughts for negative ones. You can cultivate self-compassion (2025)[31].

Accept Responsibility for Errors: Acknowledge and accept responsibility for your mistakes. If you submit a paper or lab late, own up to your error and then take corrective measures. You can make amends with a lab partner or lecturer and then prepare better the following time.

Forgiveness: When we have acted cruelly toward someone or made a mistake that has an impact on them, we are taught to express our regret. We don't always forgive ourselves for our faults, though. It's critical to forgive oneself when you make mistakes. Give yourself forgiveness if you perform poorly on an exam. If you make a bad decision, you should forgive yourself. Compassion is something we may offer to ourselves as much as to others.

Concentrate on What You Can Control: Some of us are taught that we shouldn't put our happiness first and that we oversee other people's happiness. We are instructed that concentrating on our wants is "selfish." But if you don't look after yourself, you won't have much to contribute to the long

run. You must understand that others oversee themselves, and you are only in charge of yourself. The decisions, feelings, actions, and behaviors of others are beyond your control. Individuals have the right to make their own life decisions, even if you disagree with them. Although your roommate may prefer that you stay in the dorm and study with her, you are still free to use the library. You can attend study sessions even if your pals aren't going. Regardless of what other people think, you are still in charge of your own decisions.

Take Care of Yourself: We must look after ourselves. Our bodies lose energy and nutrition when we skip meals or consume pizza and chips every night. Studying at night or napping during the day makes it hard to focus. We stay alone and isolated when we ignore friends, spend all day and night in our dorm rooms, and avoid venturing outside. We should take care of ourselves by eating three meals a day, exercising at Hamel Rec., taking a walk, laughing with people, getting at least seven hours of sleep at night, and relaxing at night with a hot shower. When academic stress is high, take three positive actions for yourself each day. You'll be happy you did.

VIII. CONCLUSION

In conclusion, exam-related procrastination, in which students drastically postpone studying until just before an exam, has detrimental effects such as elevated stress, subpar academic performance, and diminished self-esteem. This disorder is frequently caused by perfectionism, fear of failing, poor time management, and a lack of efficient study techniques. To address this problem, proactive study habits, realistic goal setting, breaking down big tasks into smaller, more manageable chunks, and asking for help from peers or teachers to manage anxiety and improve coping mechanisms are necessary. Because of the strain of last-minute preparation, procrastination surrounding examinations can lead to hurried studying, poorer grades, and increased anxiety. Several things can lead to procrastination, including perfectionism, fear of failing, a lack of knowledge about the subject, and ineffective time management. Effective study strategies, realistic goal setting, segmenting the content into manageable chunks, asking for help from tutors or peers, and engaging in relaxation exercises can all help reduce procrastination.

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Determinants of Newborn Care Practices among Mothers in Bharatpur, Nepal

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ABSTRACT

Background: Each year, approximately 130 million infants are born, and tragically, 4 million of these newborns do not survive beyond their first month. Data from hospitals indicate that the primary contributors to neonatal mortality in Nepal include infections, birth asphyxia, preterm birth, and hypothermia. To effectively tackle the issue of neonatal deaths in Nepal, it is crucial to acknowledge that 81 % of births occur at home and poorer newborn care practices.

Aim & Objective: To find out the relation between the newborn care practices and educational status of the mother, social taboos, four Antenatal care visits from trained health personnel, and parity.

Keywords: newborn care, mothers, education, ANC.

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ABSTRACT

Background: Each year, approximately 130 million infants are born, and tragically, 4 million of these newborns do not survive beyond their first month. Data from hospitals indicate that the primary contributors to neonatal mortality in Nepal include infections, birth asphyxia, preterm birth, and hypothermia. To effectively tackle the issue of neonatal deaths in Nepal, it is crucial to acknowledge that 81 % of births occur at home and poorer newborn care practices.

Aim & Objective: To find out the relation between the newborn care practices and educational status of the mother, social taboos, four Antenatal care visits from trained health personnel, and parity.

Settings and Design: This was a cross-sectional, non-interventional, and descriptive study conducted among 96 mothers with children less than six months child.

Methods and Materials: Data were collected using structured interviews and analyzed and interpreted qualitatively and descriptively.

Statistical analysis used: Descriptive statistics method was used to analyze data.

Results: Most of the respondents (83.33%) received antenatal care. Most of the respondents (92%) were literate. Literate mothers have better newborn care practices. 70% still followed the untouchable system during their last postpartum period. 99% of them allowed the touchable system according to their culture. There is a relationship between touchable systems and newborn care practices. Most of the respondents (64%) were of second parity. The study showed that the lower the parity, the better the newborn care practices. It is poorer practice than the national standard as per the national neonatal health strategy 2004, Nepal.

Conclusion: Newborn care practice is significantly associated with the education of mother, 4 ANC visits, social taboos, numbers of children.

Keywords: newborn care, mothers, education, ANC.

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I. BACKGROUND

Each year, approximately 130 million infants are born, and tragically, 4 million of these newborns do not survive beyond their first month. The vast majority of these fatalities occur in developing nations and are attributed to preventable causes (1). In developing nations, it is estimated that 34 infants per 1,000 born do not survive beyond their first month of life, with the majority of these deaths occurring in a home setting (2). Although 3 million out of 4 million young lives could be preserved through readily available, low-cost interventions, the majority of funding and research dedicated to newborn health tends to concentrate on high-tech solutions, primarily addressing the 1 % of deaths that take place in wealthy nations (3).

Health statistics indicate that approximately two-thirds of infant fatalities take place within the initial month of life. Among those who pass away during this period, around two-thirds succumb within the first week. Furthermore, of the infants

who die within the first week, two-thirds do so within the first 24 hours of their lives (4). Every hour, approximately 450 newborns lose their lives, primarily due to preventable factors, a situation that is utterly unacceptable in the 21st century (5).

Research conducted globally has revealed that 85 % of neonatal fatalities are attributed to infections, birth asphyxia, and complications arising from prematurity (6). Low birth weight is a significant factor that contributes to numerous neonatal fatalities (7). Many newborns also succumb to mortality due to their mothers' inadequate health and insufficient access to vital medical care.

Despite significant reductions in childhood and infant mortality rates in South Asia over the past ten years, neonatal mortality remains alarmingly high (8). A significant portion of neonatal mortality, accounting for 60%, and a staggering 68% of the global burden of prenatal deaths, is concentrated in Asia (9). Neonatal mortality rates in Pakistan are the highest in the region, standing at 51 deaths per 1,000 live births. This is closely followed by Bangladesh, with a rate of 50 per 1,000 live births, and India, which has a rate of 47 per 1,000 live births. In contrast, Sri Lanka reports a significantly lower neonatal mortality rate of 13 per 1,000 live births (10).

Nepal ranks third globally in neonatal mortality, with a rate of 33 deaths per 1,000 live births (11). Due to the high investment and strong preventive measures, Sri Lanka reported lower neonatal deaths in this region.

Data from hospitals indicate that the primary contributors to neonatal mortality in Nepal include infections, birth asphyxia, preterm birth, and hypothermia. To effectively tackle the issue of neonatal deaths in Nepal, it is crucial to acknowledge that 81 % of births occur at home. Only 19 % of deliveries are facilitated by Skilled Birth Attendants (SBAs), while another 19 % are conducted by traditional birth attendants, and relatives or other untrained individuals manage 50 %. Additionally, 7 % of births take place without any assistance whatsoever (12). The elevated neonatal mortality rate is closely associated with inadequate skilled birth attendance. In recent years, there has been a growing emphasis on neonatal health, both worldwide and specifically in Nepal. Policies and initiatives have recognized neonatal health as a crucial element of safe motherhood initiatives. In 2004, the national neonatal health strategy was approved to enhance the health and survival rates of newborns. This strategy aims to promote beneficial practices for newborns, discourage detrimental behaviors, and reinforce the promotive, preventive, and curative neonatal services across all tiers of the healthcare system (13).

The majority of infants are born healthy and at full term; however, the quality of care they receive in the initial hour, days, and weeks of their lives plays a crucial role in maintaining their health. This fundamental care is referred to as essential newborn care (ENC), which encompasses immediate post-birth care, care provided during the first day, and ongoing care up to 28 days after birth (14). Every newborn requires specific critical care components right at birth and throughout the first month of life, which is a particularly delicate period. It is essential to dry the newborn promptly after delivery and to ensure they are kept warm and covered at all times. The umbilical cord should be cut with a sterilized blade, and no substances should be applied to the stump. Additionally, breastfeeding should commence within the first hour following birth, and caregivers must be vigilant in monitoring for any warning signs, providing immediate treatment when necessary (15).

Objectives of the Study

- To find out the relation between the educational status of the mother and newborn care practice.
- To determine the social taboos regarding newborn care practices.
- To examine the relation between 4 Antenatal care visits from trained health personnel and newborn care practices.
- To find out the relation between parity and newborn care practices.

II. MATERIALS AND METHODS

The study design was cross-sectional, non-interventional, and descriptive. This was a quantitative study.

2.1 Sampling and Sample Site

The study population was the mothers having less than six months child and the sampling method was non-probability purposive sampling. Sample site was Bharatpur Metropolitan City of Chitwan district, Nepal. The sample site was selected purposively using a non-probability purposive sampling method. The study site was selected based on accessibility and logistic feasibility.

Sample Size: The study included 96 mothers with children less than six months child. The sample size was determined using the formula z^2pq/d^2. Based on a previous study reporting, P=0.94 where q=0.06. The value of the z=1.96. The sample size calculation accounted for a 5% test error. So, the value of d=0.05 and an anticipated 5% non-response rate was calculated.

Ethical approval was taken from the Saptagandaki Multiple Campus, Bharatpur, Chitwan, Nepal. Written consent was taken from the respective offices and respondents. The confidentiality and anonymity of the respondents were maintained. All participants were volunteers. They were free to withdraw their participation anytime during the interview.

A structured questionnaire was used to collect data. Questionnaires were pre-tested in a similar community. Data was collected by Structured interviews through house-to-house visit.

2.2 Data Analysis and Interpretation Procedure

The collected data was analyzed and interpreted in the qualitative and descriptive way with the help of simple statistical method. According to the nature of data, different types of tables, figures and diagrams were used to interpreted results.

III. RESULTS

3.1 Socio-Demographic Characteristics

Most of the respondents belonged to age group 20 to 30 years. Minimum age of respondent was 16 years and the maximum age of the respondent was 39 years. The mean age of respondent was 25.51 years. About 71% of respondents were Brahamin/ Chhetri, 20% Janajati and only 9.2 % of respondents were Dalit.

The mean age of the child was 48.97 days. The minimum age of the child was 1 day, and the maximum age of the child was 156 days.

About 80% of respondents' occupation was agriculture. So, the majority of the respondents' (80%) major source of income was agriculture. Only 11.67% respondents' major source of income was service. Nearly 79.17% respondents have their own agricultural land. Among them, only 7.37% respondents were sustained >12 months from their own land production. 46.32% were sustained 6-12 months and nearly 25.26% sustained <3 months.

Only 8% of respondents were illiterate. Most of the respondents (92%) were literate. Among literate mothers, 16.3 % with primary education, more than 76 % have lower secondary, and 16.6% with secondary and above. Most of the respondents (64%) were of second parity, and 9.33% respondents were the third parity.

3.2 ANC Utilization

Only 83.33% of respondents received ANC from trained birth attendants. At least 90% of pregnant mothers should receive ANC services from trained health attendants. Around 61% of respondents went for an ANC visit to know the condition of the fetus. 17.6% went after the counseling by FCHVs, and only 9.6% went for ANC due to the counseling by HWs. 40% of respondents did not go for ANC due to a lack of time, 28% did not feel it necessary to ANC, 12% did not go due to the health facility being far from their house, and 12% did not go due to nobody told them. More than 44% of pregnant mothers received four and more than 6% received more than four times ANC services, while 5.6% and 16.8% of pregnant mothers received only one or two-times ANC services during their last pregnancy. The national protocol recommended that all pregnant women receive 4 ANC services. Nepal had targeted at least 90% of

pregnant women would receive 4 ANC services from the health institutions.

3.3 Tetanus Vaccination

96.7% of respondents received the recommended two doses of Tetanus-Diphtheria (TD) immunization during their last pregnancy. It was higher than the national target (at least 90%). Among them, 97.9% have at least complete knowledge of TD immunization. Only 2% replied that they did not know why they received TD. Only 80% received 2 times TD among the respondent who received TD during their last pregnancy.

3.4 Iron Supplementation

Among the total respondent, around 90% received iron tablets during their last pregnancy. Among the respondents who received iron tablets, only 80 % completed 225 tablets, where 10% took less than 180 tablets and 10% took 180-225 tablets during their last pregnancy and post-partum period.

3.5 Birth Preparedness

Only 80% of respondents were prepared for an assistant during their last pregnancy. Among them, about 80% prepared health workers and the remaining prepared for their family members (mother-in-law, Sister-in-law). More than 93% of respondents prepared the place of delivery. Most of them (80%) prepared health facilities and the remaining prepared their own home. More than 93% prepared money, 53.33% prepared transportation and only 20% prepared a blood donor during their last pregnancy.

3.6 Newborn Care Practices

3.6.1 Place of Delivery

About 58% of respondents delivered their last baby at home, 26.67% in a hospital, and 15.33% in local health facilities HP. Among the respondents who delivered at home, about 30% used the Safe Delivery Kit (SDK).

3.6.2 Delivery Conducted by

More than 43% of birth attendants were family members and 33.33% were ANM/SN and 6.67% doctors. 11.43% deliveries were conducted by TBAs and more than 3% by neighbors. The National Neonatal Health Strategy 2004 suggested that all deliveries should be conducted in health facilities and supported by trained birth attendants.

3.6.3 Cord-Cutting

94.25% of respondents used a new blade, and 5.75% used an already used blade for cord cutting during their last delivery. 80% used Navi ointment, 10% used oil on the cord stump. The National Neonatal Health Strategy 2004 targeted that nobody would use anything except antiseptic on the cord stump of the neonate.

3.6.4 Drying and Bathing

The babies who were delivered in a hospital or health facility were wiped and dried immediately after birth. Among home delivery, nearly 23% of respondents wiped and dried their newborn immediately after birth and bathed their newborn after 24 hours, 55.17% bathed within one hour of birth and 17.7% within 1-24 hours in their last delivery.

3.6.5 Wrapped in Clothes

About 94% of respondents wrapped the newborn immediately after birth. Among them, 77% used thick and warm clothes and 23% used thin clothes.

3.6.6 Breastfeeding

60% of respondent breastfed their newborn within one hour, and 33.3% breastfed immediately after birth. Only 6.67% breastfed after one hour of birth. Only 6.67% breastfed extra things to their newborn before breastfeeding. 50% cow/buffalo milk and the rest fed honey, ghee, glucose, sugar water, etc. 20% started supplementary feeding to those less than three months. Among them, about 84% started to feed from birth, 10.5% from one month of age, and 5.3% from two months of age.

3.6.7 Touch Ability Until the Nomenclature Ceremony

Among the total respondents, 70% followed the untouchable system during their last delivery. Among the respondents who were in contact with others during their last post-partum period until the nomenclature ceremony, about 55% according to their culture and 37.77% due to illness, and 6.67% did not know why they were touched.

3.6.8 Living Place until Nomenclature Ceremony

95 % of respondents lived in the same house, 5 % in a separate room of the same house during their last post-partum period until the nomenclature ceremony.

3.6.9 Newborn Checkup

28% of respondents checked up on their newborn within 28 days in their last delivery. Among them, 20% of respondents checked up their newborn because they were ill, 28.6% of newborns checked up due to the counseling during delivery by health workers.

3.6.10 Illness and Treatment Practices of Newborn

20% of newborns became sick within 28 days. Among them, 35.39% suffered from diarrhea, 23.5% suffered from common cold, 17.6% suffered from fever, 9% suffered from pneumonia, and 2.8% suffered from jaundice. 80% of ill newborns were treated in health facilities and medical halls, 15% were treated from home, and nothing was done for 5% of ill newborns.

3.6.11 BCG Immunization and Growth Monitoring

100% of newborns received the BCG vaccine and growth monitoring services.

3.6.12 Knowledge of the Danger Signs of Newborns

100% of respondents know the danger signs of the newborn. However, 86.67% of respondents have complete knowledge of the danger signs of newborns, and the remaining have incomplete knowledge.

IV. DISCUSSION

Most of the respondents (83.33%) received antenatal care. 44% completed four ANC checkups in my study. This was better than the results of the National Demographic and Health Survey 2011. There is a significant relation between 4 ANC visits and newborn care practices. Among the respondents who visited ANC. 96.7% % respondents received the recommended two doses of the TD vaccine. This finding was better than the results of the National Demographic and Health Survey 2011. 90% of respondents received iron tablets during their last pregnancy. 80% of respondents completed 225 tablets during their last pregnancy and post-partum period. 80% of mothers responded that they were prepared for the birth in the last delivery. Out of them, about 80% prepared health workers and the remaining prepared their family members (mother-in-law, sister-in-law). About 93% of respondents prepared the place of delivery. Most of them (80%) prepared a health facility, 53.33% prepared for transportation, and only 20% prepared for blood during their last pregnancy. Among the total respondents, 70% still followed the untouchable system during their last postpartum period. 99% of them allowed the touchable system according to their culture. There is a relationship between touchable systems and newborn care practices. Among the respondents who delivered at home, about 30% used the Safe Home Delivery Kit (SHDK). 94.25% of respondents used a new blade for cord cutting during their last delivery. 80% used Navi ointment on the cord stump, 10% used oil on the cord stump as an applicant. 100% of newborns received the BCG vaccine**.** 100% of newborns were monitored for growth. During immunization, they practiced growth monitoring. 100% of respondents know the danger signs of the newborn. These findings of my study are better than the national status of newborn care practices as per the National Demographic and Health Survey 2011. It is poorer practice than the national standard as per the national neonatal health strategy 2004, Nepal.

V. CONCLUSION

Literate mothers have better newborn care practices. So, the education of mothers plays a positive role in newborn care practices. The mothers who have lesser number of children have good newborn care practice. My study shows that if there is higher the parity or number of children, there is poor newborn care practice. The study found that mothers who had four or more ANC visits did better in newborn care practice. Thus, 4 ANC visits in health facilities are responsible for newborn care practice. Mothers who did not follow social taboos like the touchable system before the nomenclature of newborns had good newborn care practice in comparison with mothers who followed the social taboos.

VI. RECOMMENDATION

- Intersectoral collaboration should be promoted by ensuring advocacy for and commitments to newborn health at the district and community level, focusing on poor, uneducated, and excluded groups.
- Health Policy should be revised to ensure birth preparedness and institutional delivery.
- All people should be informed about the "Safe Motherhood Program to promote newborn care practices.
- Community leaders and community members should be mobilized to play an active role in creating a suitable environment for promoting newborn health.
- Skill Birth Attendant training should be provided for nursing staff working in health facilities.
- Advocacy for emergency transport and funds from communities to birthing centers should be ensured.
- Community-based awareness on birth preparedness, newborn care practices before birth, at birth, and after birth should be implemented.
- Health education and behavior change communication on essential newborn care practices should be ensured.
- Research activities should be promoted on newborn health to improve planning, higher quality services, and more cost-effective interventions.
- Awareness raising programs about institutional delivery, newborn care practices should be strengthened through local FM, Radio, poster, street drama, school camping, etc.

Recommendation for Further Research

- This study examined some socio-economic and demographic characteristics of respondents, the role of the husband in newborn care practice can be included in other studies.

Limitations of the Study

- Due to limited resources and limited time for field visits, only those wards considered feasible and accessible within the research period were included in the sample.
- The study was limited only to mothers having children less than six months, and the sample was purposively selected.
- The time frame for this study was only 30 days.

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Table 1: Socio-Demographic Characteristics of the Respondents

Age of Respondents		
Age group(Yrs)	Number	Percentage
<20	80	53.33
20-30	55	36.67
30-40	15	10
Occupations		
Agriculture	120	80
Service	14	9.33
Others	16	10.67
Major source of Income		
Agriculture	120	80
Service	14	11.67
Business	6	4
Others	10	6.67
Having own agricultural land	95	79.17
Sustainability from own land		
<3 months	24	25.26
3-6 months	20	21.05
6-12 months	44	46.32
>12 months	7	7.37
Educational level		
Illiterate	12	8
Among Literate		
Primary	38	27.54
Lower Secondary	83	60.14
Secondary and above	17	12.32
Parity		
First parity	40	26.67
Second parity	96	64
Third parity	14	9.33

Table 2: Newborn Care Practices and Associated Factors

Economic Status	Newborn Care Practice					
	Poor		Good		Total	
	Number	%	Number	%	Number	%
Poor	20	47.62	24	45.28	44	46.32
Rich	22	52.38	29	54.72	51	53.68

Educational Status	Newborn Care Practice					
	Poor		Good		Total	
	Number	%	Number	%	Number	%
Illiterate	10	55.56	2	1.52	12	8
Literate	8	44.44	130	98.48	138	92

Educational level	Newborn Care Practice					
	Poor		Good		Total	
	Number	%	Number	%	Number	%
Primary	15	28.84	23	26.74	38	27.54
Lower secondary	30	57.69	53	61.63	83	60.14
Secondary and above	7	13.47	10	11.63	17	12.32

Parity	Newborn Care Practices					
	Poor		Good		Total	
	Number	%	Number	%	Number	%
Less	5	11.11	35	33.34	40	26.67
High	30	66.67	66	62.86	96	64
Higher	10	22.22	4	3.8	14	9.33

4 ANC Visit	Newborn Care Practices					
	Poor		Good		Total	
	Number	%	Number	%	Number	%
<4 ANC visit	40	74.07	21	29.58	61	48.8
4 ANC visit	14	25.93	50	70.42	64	51.2

Touch ability	Newborn Care Practice					
	Poor		Good		Total	
	Number	%	Number	%	Number	%
Touchable	25	41.67	75	88.24	105	70
Untouchable	35	58.33	10	11.76	45	30

Bilateral Thalamic Stroke in a Young Adult: A Rare Presentation of Artery of Percheron Infarction

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ABSTRACT

Artery of Percheron (AOP) infarcts are rare ischemic strokes resulting from occlusion of a solitary arterial variant supplying the paramedian thalami and rostral midbrain. We present the case of a 26-year-old previously healthy female who presented with acute altered consciousness and vertical gaze palsy. MRI brain revealed symmetric bilateral thalamic diffusion restriction, consistent with AOP infarction. This case underscores the importance of considering this rare stroke subtype in young patients presenting with unexplained coma or altered mental status.

Keywords: artery of percheron, thalamic infarct, bilateral stroke, young adult, vertical gaze palsy, altered consciousness.

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Dr. Hassan Bhatti

ABSTRACT

Artery of Percheron (AOP) infarcts are rare ischemic strokes resulting from occlusion of a solitary arterial variant supplying the paramedian thalami and rostral midbrain. We present the case of a 26-year-old previously healthy female who presented with acute altered consciousness and vertical gaze palsy. MRI brain revealed symmetric bilateral thalamic diffusion restriction, consistent with AOP infarction. This case underscores the importance of considering this rare stroke subtype in young patients presenting with unexplained coma or altered mental status.

Keywords: artery of percheron, thalamic infarct, bilateral stroke, young adult, vertical gaze palsy, altered consciousness.

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I. INTRODUCTION

The Artery of Percheron (AOP) is an uncommon vascular variant in which a single perforating branch from one posterior cerebral artery supplies both paramedian thalami and occasionally the rostral midbrain. An occlusion in this artery typically leads to bilateral thalamic infarction, sometimes extending to the midbrain, and presents with a variety of neurological signs, most notably impaired consciousness, vertical gaze palsy, and memory disturbances (Lazzaro et al., 2010).

Because of its rarity and the subtle findings on initial imaging, AOP infarction may be underdiagnosed, particularly in young individuals who lack traditional stroke risk factors. Prompt recognition is crucial for proper management and to mitigate potential long-term neurological deficits (Arauz et al., 2014).

II. CASE PRESENTATION

A 26-year-old previously well female was found unresponsive at home by family members. She had complained of a mild headache the night before but had no history of trauma, infection, or substance use. There was no preceding seizure activity or fever. Her medical, drug, and family history were unremarkable.

On arrival to the Emergency Department

- *Glasgow Coma Scale (GCS):* 7 (E2V2M3)
- *Vital signs:* Within normal limits.
- *Neurological Examination:* Decreased responsiveness, vertical gaze palsy, preserved pupillary reflexes, and mild right-sided hemiparesis. Plantar responses were flexor bilaterally. No neck stiffness or photophobia.
- *Initial labs:* Normal full blood count, electrolytes, renal and liver function, coagulation profile; negative urine drug screen

Imaging

- *CT Brain (non-contrast):* No acute hemorrhage or early ischemic changes.
- *MRI Brain with DWI:* Symmetric diffusion restriction in bilateral paramedian thalami, consistent with AOP infarction.
- *MRA/CTA:* Normal Circle of Willis anatomy except for non-visualization of the AOP (as expected); no evidence of vertebrobasilar stenosis

Further Workup

- *Echocardiogram (TTE + bubble study):* Demonstrated a patent foramen ovale (PFO) with right-to-left shunt.
- *Holter Monitoring (72h):* Sinus rhythm
  Thrombophilia screen: Negative
- *Infectious and Autoimmune panels:* Unremarkable

- Lumbar puncture- Unremarkable

Management

The patient was admitted to the stroke unit and received supportive care. Antiplatelet therapy (aspirin 300 mg) was initiated. No thrombolysis was given due to late presentation beyond the therapeutic window.

Given the presence of a patent foramen ovale (PFO), the stroke team initiated discussions with cardiology regarding the appropriateness of PFO closure to reduce the risk of recurrent embolic events.

Rehabilitation was initiated early with physiotherapy, occupational therapy, and speech therapy input. Over the next two weeks, her mental status gradually improved. Vertical gaze palsy persisted, but memory and motor function improved significantly. She regained functional independence over the next few weeks in basic activities of daily living and was discharged to a to acute stroke care unit? facility for ongoing therapyand then subsequently home.

Neuropsychological testing revealed mild anterograde memory impairment but preserved executive function and language skills.

III. DISCUSSION

AOP infarctions are estimated to represent a small fraction of all ischemic strokes and comprise a notable percentage of bilateral thalamic strokes (Lazzaro et al., 2010). They often manifest with a triad of symptoms: altered consciousness, oculomotor disturbances—particularly affecting vertical gaze—and cognitive or memory deficits.

The thalamus plays a vital role in processing sensory and motor signals, as well as regulating consciousness and alertness. Damage to both paramedian thalami disrupts these functions, resulting in the profound neurological symptoms observed (Percheron, 1973).

Diagnosing AOP infarction can be challenging due to the subtlety of early imaging changes. CT scans may appear normal initially, making MRI with diffusion-weighted imaging essential for early and accurate detection. MRA and CTA typically do not visualize the AOP directly due to its small size (Matheus & Castillo, 2003).

The management of AOP infarcts follows the standard approach for ischemic strokes, involving supportive care and antiplatelet therapy. Identifying potential embolic sources, such as cardiac anomalies or thrombophilia, is especially important in young patients. Recovery outcomes are variable, ranging from full resolution to persistent neurological deficits (Arauz et al., 2014).

Although our patient was young and lacked conventional vascular risk factors, the identification of a patent foramen ovale suggested a potential cardioembolic etiology, and closure was being actively considered, the clinical and radiological features were classic for AOP infarction. This reinforces the importance of considering anatomical stroke variants in young adults and maintaining a low threshold for advanced imaging when initial CT findings are inconclusive.

IV. CONCLUSION

AOP infarction should be considered in the differential diagnosis of young patients who present with sudden onset of reduced consciousness and vertical gaze abnormalities. Early use of MRI can help avoid diagnostic delays and enable prompt initiation of appropriate therapy and rehabilitation. Comprehensive workup to exclude cardioembolic or prothrombotic causes remains essential, even in previously healthy individuals.

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Clinical and Histological Findings Following a Single Session of Recombinant Enzymes Applied to the Abdomen of Patients with Fibrosis Sequelae from Liposuction

Dr. Julio Alberto Giraldo Mesa, Dr. Gustavo Matute Turizo, Dr. Sara María Vieira Ríos, Dr. Valeria Kopytina & Dr. Jorge López Berroa

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ABSTRACT

Introduction: Liposuction is the most commonly performed plastic surgery, aimed at improving both the physical appearance of patients and their self-esteem. However, like any surgical intervention, it can present complications. One of the most frequent is contour irregularity, which, although not usually severe, has both physiological and aesthetic implications for the patient.

Objective: The general objective of the research is to observe the histological and clinical changes in the abdominal skin of five women who developed fibrosis as a complication of an abdominal liposuction performed more than two years ago, following a single application of recombinant enzymes. This will be done by describing these changes, analyzing the relationship between clinical and histological findings, and comparing the results before and after the enzyme application.

Keywords: recombinant enzymes, inflammation, collagen, liposuction, fibrosis.

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Clinical and Histological Findings Following a Single Session of Recombinant Enzymes Applied to the Abdomen of Patients with Fibrosis Sequelae from Liposuction

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ABSTRACT

Introduction: Liposuction is the most commonly performed plastic surgery, aimed at improving both the physical appearance of patients and their self-esteem. However, like any surgical intervention, it can present complications. One of the most frequent is contour irregularity, which, although not usually severe, has both physiological and aesthetic implications for the patient.

Objective: The general objective of the research is to observe the histological and clinical changes in the abdominal skin of five women who developed fibrosis as a complication of an abdominal liposuction performed more than two years ago, following a single application of recombinant enzymes. This will be done by describing these changes, analyzing the relationship between clinical and histological findings, and comparing the results before and after the enzyme application.

Methods: The study is a descriptive longitudinal one, conducted on 5 women between the ages of 33 and 60 with post-liposuction fibrosis, without previous treatments except for massages and radiofrequency. The cases were selected through simple random sampling. Both photographic records and biopsies were taken before and after the enzyme application.

Results: The results showed significant clinical improvement in skin quality and texture, with a reduction in lumpiness and contour regularization. Histologically, a decrease in collagen basophilia and inflammatory response was observed, as well as a decrease in fragmented elastic fibers and an increase in intact elastic fibers. Regarding collagen fibers, greater integrity and homogeneity were noted.

Conclusion: the application of recombinant enzymes resulted in significant clinical and histological improvements. This treatment proved to be safe, reliable, and easy to apply, with high patient satisfaction, suggesting its potential to replace more invasive treatments in the management of post-liposuction fibrosis.

Keywords: recombinant enzymes, inflammation, collagen, liposuction, fibrosis.

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I. INTRODUCTION

Liposuction is one of the most commonly performed surgical procedures worldwide and, according to the International Society of Aesthetic Plastic Surgery (ISAPS), it was the most frequently performed procedure globally in 2022. In Colombia, liposuction accounted for 17.1% of all surgical procedures performed in the country in 2022 [1].

Although liposuction is a widely performed procedure for aesthetic enhancement, it is not devoid of medical concerns. Severe complications exist, although they are uncommon, while less severe post-surgery complications, such as hematomas, hyperpigmentation, and contour imperfections, may occur more frequently [2]. Wu et al. [3] pointed out that contour irregularity is the most common complication of liposuction. Up to 9% of patients may report soft tissue depressions or elevations, fibrosis, skin panicles, folds, or wrinkles, with also loss of elasticity [3,4]. Another study [5] indicated that the least severe and most prevalent complication was irregular contour, observed in 12% of 50 patients who underwent liposuction with an "abdominal etching" design.

The surface irregularities condition results from an inflammatory process leading to abnormal scarring, characterized by skin and subcutaneous tissue (SCT) hardening due to an imbalance in collagen production or fat necrosis. This complication can be caused by excessive liposuction, superficial suction, pre-existing adhesions and fibrosis, redundant skin or inadequate compression or posture [4,6,7]. Patients with pre-existing cellulitis, poor skin elasticity, and scarring are more prone to suffering from this problem [7,8] and they should be forewarned about the risk for contour irregularities and suboptimal skin contraction.

The shift in aesthetic perception of the human body has promoted advancements in surgical techniques among physicians [9]. This has led to the incorporation of various technologies in liposuction, which, in one way or another, may contribute to the development of this complication.

Postoperative approaches, such as massage, lymphatic drainage, and the use of ultrasound or radiofrequency [10], are among the treatments that may help prevent this complication. Several scientific studies have demonstrated the use of recombinant enzymes in the treatment of various dermo-aesthetic conditions, which fibrosis was involved [11,12]. However, no data is available in the literature regarding histological changes in the skin following treatment with recombinant enzymes.

This study aims to visually assess changes in patients with surface irregularities after a liposuction and analyze the associated histological modifications to validate and support the observed clinical modifications after applying a pbserum HIGH recombinant enzymatic cocktail.

II. MATERIALS AND METHODS

This is a descriptive longitudinal study where 5 patients aged between 33 and 60 were included. These patients had a history of liposuction performed more than two years prior, specifically in the abdominal area, and presented fibrosis, retractions, induration, surface irregularities, and skin discoloration of the abdomen as secondary complications of the procedure. All participants were healthy, non-smokers, not pregnant, and had not previously undergone treatments with injected substances. However, they may have previously cared for their skin with moisturizers and/or sunscreens, or mechanical procedures, such as massages or radiofrequency.

Participants were fully informed about the purpose, risks, and benefits of the study, as well as their rights. They signed an informed consent form for biopsy collection, product application, photographic documentation, data treatment, and authorization for publication of data and photos. All data was handled confidentially. Participants had the autonomy to decide their participation and were free to withdraw at any time.

Prior to the application of the recombinant enzymes, an initial photographic record was taken. A skin biopsy was then collected from the suprapubic region using a N4 punch, with aseptic procedures and local anesthesia with 1% lidocaine without epinephrine.

Thirty minutes before pbserum HIGH injections, a topical anesthetic was applied to the area to be treated. A strict antiseptic control was performed, washing the area with 3-minute surgical chlorhexidine soap before the procedure began.

The product studied was pbserum HA 2.0 HIGH (supplied by pbserum Proteos Biotech S.L.) which consists of a 1.5 ml syringe of 0.1% sodium hyaluronate, obtained from Streptococcus equi subsp. zooepidemicus. A vial contains 3 recombinant bacterial enzymes: collagenase PB220, lipase PB500 and lyase PB72K; lyophilised and in different proportions. There is a vial of saline solution. The enzymes were reconstituted with the sodium hyaluronate, and the amount of saline solution required for the area to be treated and with the addition of 0.5 cc lidocaine 1% without epinephrine. For product injection, 3 cc syringes with 30G x 1 hypodermic needles were used, and the solution was administered subcutaneously as well as in fat deposits following a cephalic vectorization technique recommended by the authors, as shown in Figure 1.

Five days after the application of pbserum HIGH, a radiofrequency session was performed. After 45 days, the patients were recalled for a second photographic recording and biopsy collection from the same area as the initial sample. All photos were taken by the same individual using an iPhone 15 Pro camera without flash and without any retouching.

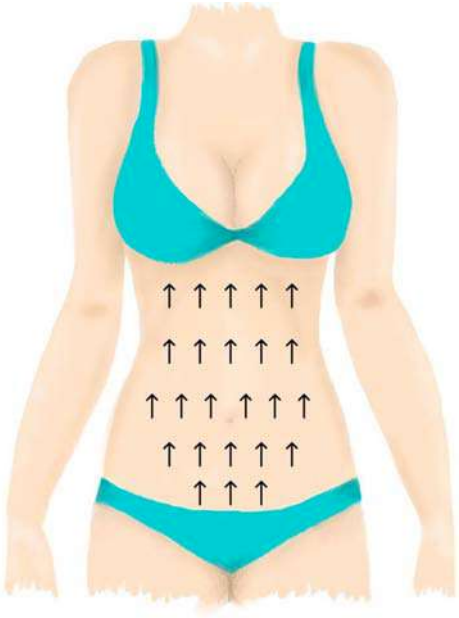

Figure 1: Schematic design of the subcutaneous application of recombinant enzymes in the abdomen through a cephalic vectorization, proposed and recommended by the authors

The biopsies were immediately placed in containers with 10% neutral formalin at a ratio of 10 parts formalin to the volume of the sample and sent to the pathology laboratory. All samples were processed and analyzed within 24 hours of biopsy collection. The samples were fixed for at least 6 hours and then conventionally processed automatically for 12 hours in formalin, alcohol, xylene, and paraffin. Subsequently, they were embedded in paraffin blocks and sectioned at 3 microns using a microtome, followed by staining with (i) hematoxylin and eosin (H&E); (ii) trichrome stain for collagen, elastin and muscle visualization; it is specifically used to visualize fibrotic tissue; and (iii) elastic stain for better visualization of elastic fiber fragmentation and integrity. The sections were examined by the same pathologist, who compared the findings from the H&E, trichrome, and elastic stains in the biopsies taken before and after the recombinant enzyme application.

After the application of the enzymes, patients were instructed to maintain proper hydration and avoid any form of anti-inflammatory therapy, including cold applications, medications, or massages. In the event of ecchymosis, they were advised to camouflage these signs with makeup and sunscreen only. Patients were also instructed to refrain from physical activity for 48 hours and

could resume their daily activities the day after the procedure. Each patient was informed about the potential adverse effects or discomfort they might experience following the procedure.

III. RESULTS

3.1 Visual Clinical Changes

The patients were evaluated 45 days after a single application of pbserum HIGH to the skin of the abdomen affected by this condition. Significant improvements were observed in the quality, texture, and coloration of the skin, as well as a marked reduction in the thickening and regularization of the contour.

It is important to note that the changes were perceived by the evaluators as well as reported by the patients themselves.

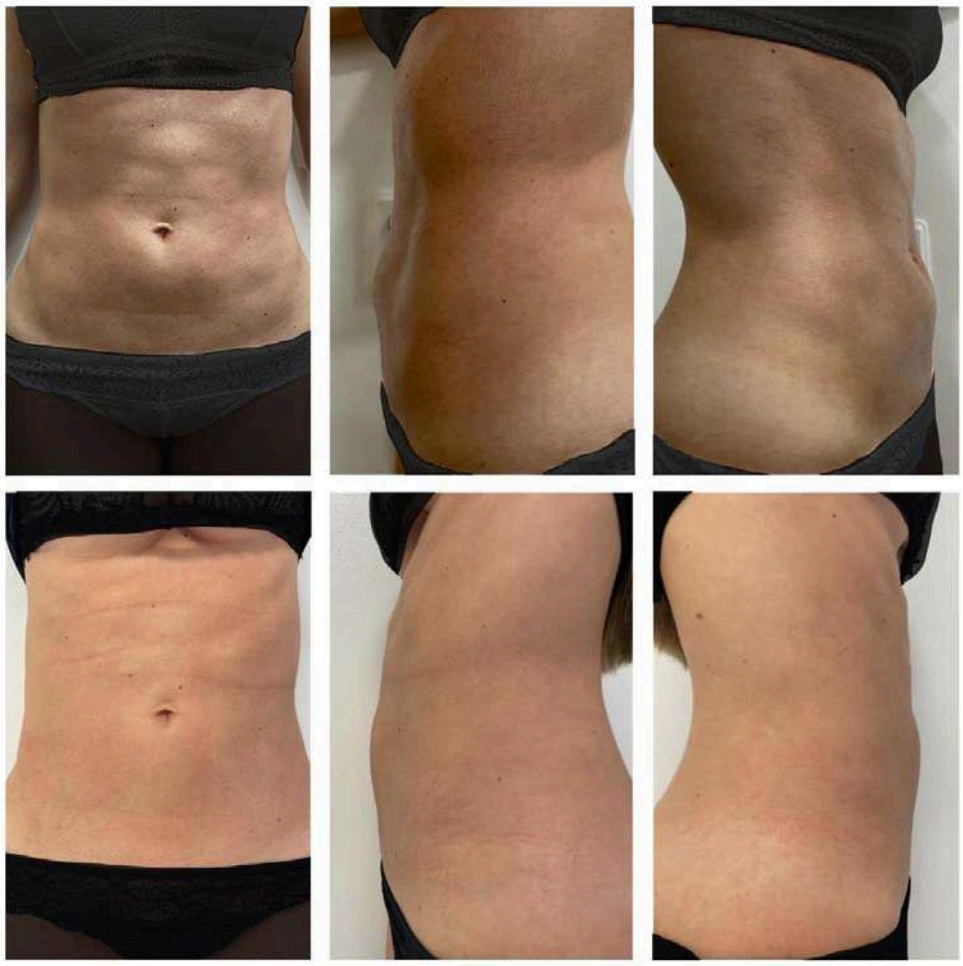

Figure 2: Visual Clinical Changes A. Before the application of pbserum HIGH. B. Forty-five days after a single application of pbserum HIGH, improvements in contour, reductions in fatty deposits, and enhancements in the texture and coloration of the abdominal skin were observed.

Figure 3: Visual Clinical Changes. A. Before the application of pbserum HIGH. B. Forty-five days after a single application of pbserum HIGH, an improvement in abdominal skin irregularities induced by liposuction was observed.

Figure 4: Visual Clinical Changes. A. Before application of pbserum HIGH. B. After forty-five days of a single session of pbserum HIGH a reduction in surface irregularities and improvement in skin uniformity were observed.

3.2 Histological Findings Prior to the Application of Recombinant Enzymes

In the H&E-stained slides, where skin samples from the abdomen were evaluated prior to the application of recombinant enzymes, normal-thickness squamous epithelium was observed in 4 patients (80%), hyperkeratosis with parakeratosis in 4 patients (80%), dermal fibrosis in 1 patient (20%), and collagen fragmentation in the dermis in 2 patients (40%).

In the elastic-stained slides, elastic fiber fragmentation throughout the dermal thickness was observed in 4 patients (80%).

In the trichrome-stained slides, fragmented dermal collagen with aggregation was observed in 4 patients (80%).

3.3 Histological Findings After the Application of Recombinant Enzymes

In the H&E-stained slides, where abdominal skin samples were evaluated after the application of recombinant enzymes, normal-thickness squamous epithelium was observed in 4 patients (80%), dermis with minimal basophilic collagen changes in 3 patients (60%), dermis with no basophilic collagen changes in 1 patient (20%), and sparse superficial mononuclear inflammatory infiltrate in 4 patients (80%).

In the elastic-stained slides, neoformation of elastic fibers was observed in 4 patients (80%).

In the trichrome-stained slides, the presence of new collagen bands was observed in 4 patients (80%).

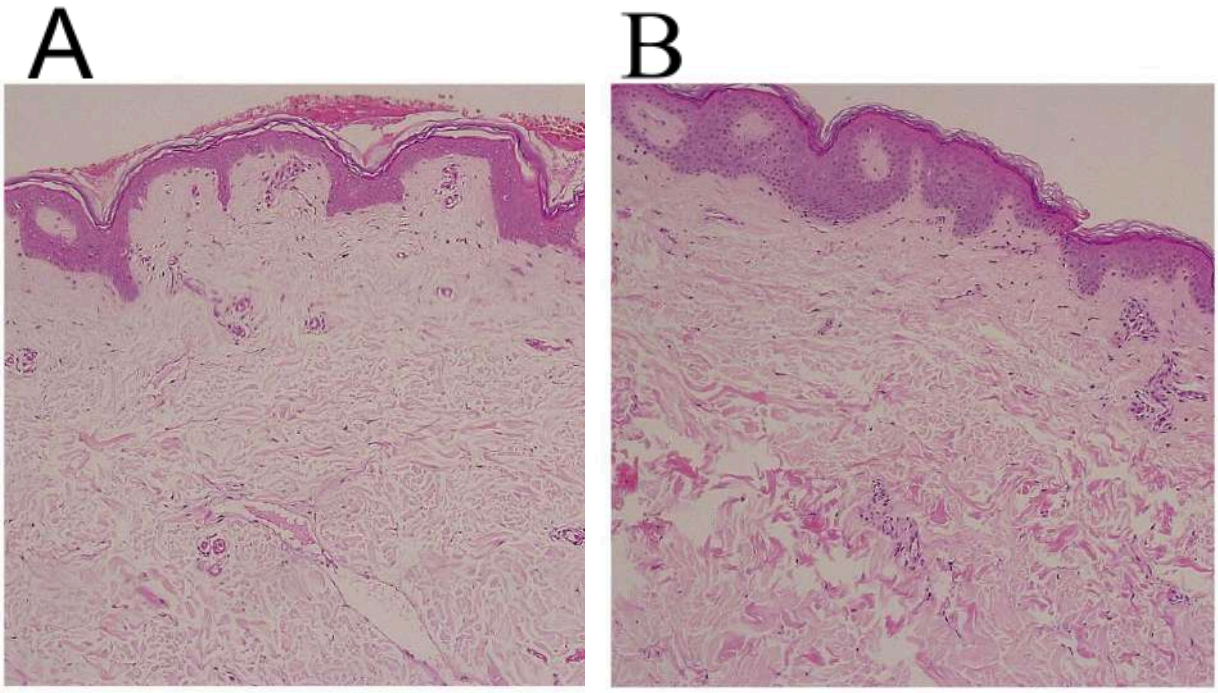

Figure 5: Hematoxylin and Eosin Staining x10: A. Pre-treatment biopsy: Hyperkeratosis with parakeratosis and basophilic changes in the collagen are observed. B. Post-treatment biopsy: A reduction in hyperkeratosis and parakeratosis, as well as an improvement in the basophilic changes of collagen, are observed.

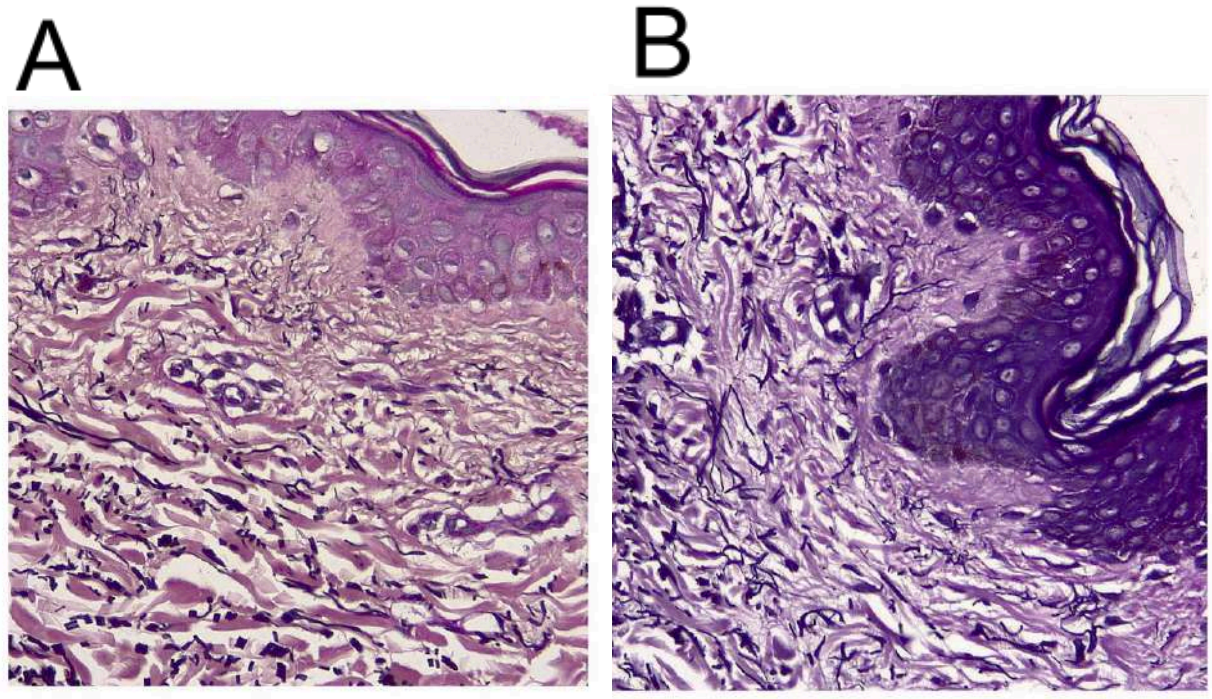

Figure 6: Elastic Staining x40. A. Pre-treatment biopsy: Fragmented elastic fibers with aggregations are observed. B. Post-treatment biopsy: A reduction in fragmented fibers and the appearance of homogeneous elastic fibers are observed.

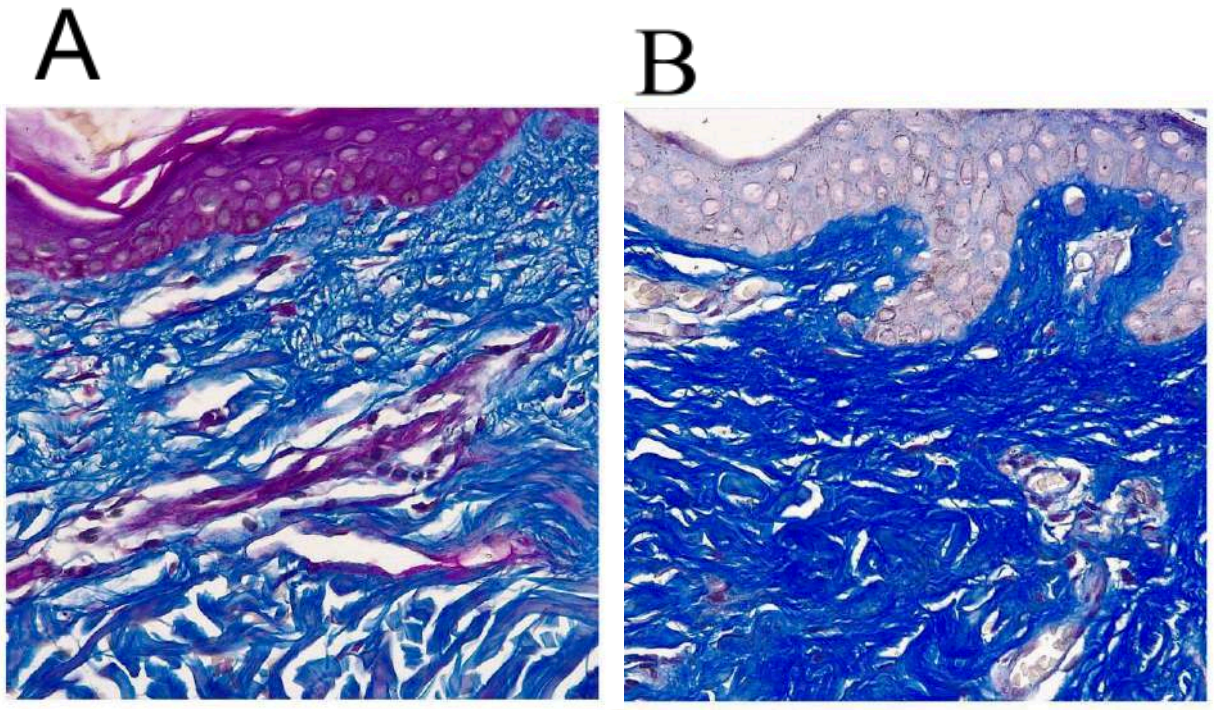

Figure 7: Trichrome Staining x40. A. Pre-treatment biopsy Fragmented collagen is present. B.Post-treatment biopsy: Regeneration of homogeneou collagen fibers and a reduction in fragmented fibers is observed.

IV. DISCUSSION

Liposuction has gained significant relevance in aesthetic medicine and in the perception of body image, as it offers a quick solution to improve body harmony and proportion. Liposuction is an aesthetic surgical procedure aimed at selectively removing localized fat deposits from different areas of the body through assisted suction. This procedure offers the advantage of enhancing body contour with minimal scarring. Traditionally, subcutaneous fat aspiration is performed in a deep plane, as there is concern that superficial liposuction may be associated with higher complication rates, including contour irregularities, seroma formation, hyperpigmentation, chronic induration, and fibrosis [2,13,14].

Contour irregularities compromise the aesthetic result of surgery and are a major technical challenge. It is mostly accompanied by fibrosis, as a local complication, which is defined as the abnormal scarring of tissues, resulting from the excessive production of collagen during the healing process, leading to thickening of the surrounding tissues and hardening of the affected area. One of the causes of fibrosis is fat necrosis, which occurs due to the trauma caused by liposuction [15].

Fibrosis is a common complication; however, it is important to note that most statistics, both global and local, are not highly reliable due to the significant amount of underreporting. In a study conducted in the city of Cali between 1983 and 2008, which included 26,259 liposuction procedures using different techniques, the incidence of fibrosis was 2.3% [16]. In a study of 417 patients, transient nodular fibrosis was found in 81 patients (19.42%) and permanent fibrosis in 2 patients (0.47%) [13]. Early compression, lymphatic drainage, and radiofrequency for two weeks in the postoperative period are recommended to prevent this complication [13].

While the therapeutic management of skin alterations has been addressed through various invasive and non-invasive treatments [4,10,17,18], the arrival of the recombinant enzymes has opened a new perspective for the treatment of the previously mentioned postoperative complication. The collagenase enzyme has also been successfully used for the treatment of different pathologies where there is an accumulation of fibrotic tissue,

such as Dupuytren's disease, arthrofibrosis and Peronie's disease [19-21], achieving approval from the EMA and FDA for these conditions [12].

The cocktail of the recombinant enzymes pbserum HIGH contains the following enzymes: Collagenase PB220, Lipase PB500, and Lyase PB72K. It is important to highlight that this enzymatic system contains a higher concentration of collagenase.

When the enzymes are injected into the skin, collagenase breaks down the peptide bonds in collagen, degrades loose and non-functional fibers, and stimulates the production of a new collagen network, thereby improving skin appearance and texture [22]. Lipase hydrolyzes triglycerides within adipocytes, reducing their size and thereby diminishing localized fat deposits without damaging surrounding tissue [23]. Lyase degrades polysaccharides in the extracellular matrix, reducing inflammation and enhancing the penetration of other enzymes into the tissues [24].

With the application of a single session of the recombinant enzymes pbserum HIGH, we observed clinical and histological evidence of improvement in the quality and texture of the skin on the abdomen, as well as a notable reduction in the induration and contour regularization. These results are consistent with those obtained in other studies on the application of enzymes in fibrotic alterations [25,26].

When comparing the findings from biopsies taken before and after the application of recombinant enzymes, it can be concluded that after application of pbserum HIGH there is a decrease in the basophilia of the collagen, hyperkeratosis with parakeratosis, and the inflammatory response. Additionally, regeneration and neogenesis of elastic and collagen fibers were observed, with a decrease in the number of fragmented elastic and collagen fibers and their conglomerates, showing greater homogeneity.

Based on the visual and histological findings, we could recommend the use of pbserum HIGH enzymes in the early postoperative period (4-6 weeks) to prevent the onset of this significant complication in patients undergoing liposuction.

The use of recombinant enzymes was safe for all patients. And they experienced a rapid recovery. The level of patient satisfaction was remarkably high, as the improvements were both perceived and reported by the patients themselves, leading all study participants to request a repeat treatment.

Beyond its efficacy, safety, and high patient satisfaction, the procedure was straightforward to perform, requiring only a short learning curve for its application. Proper use of recombinant enzymes has the potential to replace other dermatological treatments, such as radiofrequency, ultrasounds, lasers, and device-based procedures. This is due to its ease of application, low risk of complications, and rapid recovery, allowing patients to return to their daily routines with minimal downtime.

V. CONCLUSION

A single dose of pbserum HIGH produced an improvement in skin quality and texture, and a notable reduction in the induration and contour regularization in abdomen, which has previously post-liposuction surface irregularities with associated fibrosis. This is the first study to present histological data regarding the use of recombinant enzymes in addressing this abdomen complication. The analysis of the biopsied tissues supported the visual results. Pbserum HIGH injections were safe, and easy-to-apply treatment and it achieved high levels of patient satisfaction. More studies are needed to get a better understanding of the effect of the recombinant enzymes visual and microscopically.

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Availability of Data and Materials

Not applicable.

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Financial Support and Sponsorship

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Conflicts of Interest

Dr. Giraldo Mesa, Dr. Matute Turizo and Dr. Vieira Ríos declare they do not have conflict of interest. Dr. Kopytina and Dr. López-Berroa are employees of Proteos Biotech.

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