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Case Report

Speech-Language Therapy Approach to the Scarring Process after Facial Soft Tissue Trauma: A Clinical Case Report

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ABSTRACT

Facial soft tissue trauma can change muscle structure, affecting the functions of the stomatognathic system and causing injuries at the integumentary level, which leads to the formation of scar tissue that restricts the mobility of orofacial structures. Few reports in the specialized literature describe the approach of speech-language therapy to these injuries. Therefore, this study aims to describe the speech-language therapy approach to scarring, using myofunctional therapy, in a case of facial soft tissue trauma. A patient with soft tissue trauma in the lower third of his face was evaluated by speech-language therapy. His injury caused adhesions and contractions, which were associated with disturbances in his stomatognathic system that affected movement, sensitivity, and position, as well as his speaking, chewing, and swallowing functions. The patient attended 10 sessions over 3 months, at which point he expressed his satisfaction with the intervention and decided to end it. The final evaluation showed an improvement in lip symmetry during rest and movement, greater lip and cheek movement amplitude, adequate sensitivity, and absence of pain. Furthermore, progress was observed in orofacial functions related to swallowing (consistent lip seal and complete food retention), chewing (adequate speed and central incision), and speech (articulatory precision). The results of this case show that speech-language therapy intervention is essential in facial trauma and scar rehabilitation.

Keywords:
Cicatrix; Myofunctional Therapy; Manipulative Therapy; Speech-Language Science

Abordaje fonoaudiológico en proceso cicatricial post trauma facial de tejidos blandos: relato de caso clínico

RESUMEN

Los traumatismos faciales de tejidos blandos generan cambios en la estructura muscular afectando la ejecución de las funciones del sistema estomatognático y lesiones a nivel tegumentario, dando lugar a formación de tejido cicatricial que restringe la libre movilidad de las estructuras orofaciales. En la literatura especializada, son limitados los reportes en relación con el abordaje fonoaudiológico de estas lesiones; por ello, el objetivo de este estudio es describir el abordaje fonoaudiológico de cicatrices por medio de la terapia miofuncional en un caso de traumatismo facial de tejidos blandos. Fue realizada una evaluación fonoaudiológica de un usuario con traumatismo facial de tejidos blandos en tercio facial inferior, asociado a adherencias y contracciones, que provocaba alteraciones en el sistema estomatognático relacionadas al movimiento, sensibilidad, postura y las funciones de habla, masticación y deglución. Se realizaron 10 sesiones en un periodo de 3 meses, momento en que el usuario manifiesta su satisfacción con la terapia y decide finalizarla. En la evaluación final se evidenció disminución de asimetría labial en reposo y función, mayor amplitud en movimientos labiales y mejillas, adecuada sensibilidad, ausencia de dolor y avances en funciones orofaciales de deglución (selle labial consistente y retención total del alimento), masticación (velocidad adecuada e incisión central) y habla (precisión articulatoria). Los resultados de este caso evidencian que la intervención fonoaudiológica es fundamental en la rehabilitación de traumas faciales y cicatrices.

Palabras clave:
Cicatriz; Terapia Miofuncional; Terapia por Manipulación; Fonoaudiología

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INTRODUCTION

Orofacial myofunctional therapy is the area of speech-language therapy dedicated to the study, research, prevention, assessment, diagnosis, development, habilitation, improvement, and rehabilitation of the structures and functions of the orofacial and cervical regions (Comitê de Motricidade Orofacial da Sociedade Brasileira de Fonoaudiología, 2004).

From this definition, and considering the diversity of pathologies and dysfunctions that can affect the stomatognathic system, this specialty has been divided over the years into subareas of speech-language therapy intervention. One such subarea is the assessment and intervention of facial trauma, defined as the disturbance of the dentoalveolar complex, soft tissues, and craniofacial bones. This disturbance can occur as an isolated event or be part of a larger injury to the organism (Hernández, 2010; Kotecha et al., 2008).

Regarding soft tissue injuries, these can be superficial or deep. The most common causes include falls, accidents during daily activities, car accidents, animal attacks, recreational accidents, self-inflicted injuries, and interpersonal violence. Such injuries affect both genders equally and are observed primarily around the age of 28 years on average (Braun & Maricevich, 2017; Gassner et al., 2003; Kraft et al., 2012).

In the case of facial trauma, there is an anatomofunctional impact and long-term aesthetic deficit (Campolo et al., 2017). This results in a damaged body image, lower self-esteem, and a significant social impact (Levine et al., 2005; Sahni, 2018).

Facial trauma affecting soft tissues triggers a process of scarring at the injury site. This is a natural process leading to tissue repair after damage to the skin, that extends into the reticular dermis (Vincent et al., 2019). It consists of three overlapping phases: the inflammatory phase (from the onset of tissue damage to 2-3 days post-injury), the proliferative phase, where the growth of new tissue begins (2-3 days to 3-6 weeks post-injury), and the remodeling phase, beginning once the wound is closed and the scar tissue matures, which can last a year or more (Lee & Jang, 2018). This new tissue is different from undamaged skin in terms of color, thickness, elasticity, texture, and degree of contraction (Andrades et al., 2006).

In order to clinically identify the type of scar, Rohrich and Robinson, in 1999, proposed a classification of the scarring process into normal, pathological, and aesthetically undesirable. Pathological scarring, the focus of this study, would result from excessive scar production, leading to hypertrophic scars, contractures, and/or keloids (Rohrich Robinson, 1999 in Andrades et al., 2006).

Scarring processes in soft tissue traumas caused by cutting, muscle laceration, and loss of muscle or skin tissue limit the mobility of orofacial structures, resulting in tension and lack of elasticity that interfere with orofacial functionality (Bianchini, 2014). Therefore, the speech-language therapy approach to such injuries is varied, depending on factors such as the type of facial trauma, the resulting injury, the affected region, and the degree of compromise resulting from the surgical or conservative procedures that are indicated and performed (Bianchini, 2014). According to Trawitzki (2009) and Trawitzki et al. (2019), the sequelae justifying myofunctional intervention include muscle stiffness and tension, pain at rest and during movement, temporomandibular joint pain, and dysfunctions in chewing, swallowing, and speech, including deficits in facial expression and sensitivity.

The objective of this case report is to present the speech-language therapy intervention in a case of facial soft tissue trauma and the resulting scarring process. This aims to contribute to the knowledge and development of this area of intervention in the country.

ETHICAL CONSIDERATIONS

This clinical case, identified by project number 142-22, was declared exempt from review by the ethics committee of Universidad San Sebastián. Additionally, informed consent was signed by the subject, who agreed to the disclosure of their case.

DEVELOPMENT

A 43-year-old male subject is presented, who experienced facial soft tissue trauma in his lower right facial third, near his philtrum, and injury to his right nasolabial groove. This was caused by a human bite following a public altercation. The subject sought care at a public hospital, where he was admitted to the emergency and surgery unit.

The medical report indicates the "presence of a laceration with irregular edges and a triangular shape of approximately 3 centimeters, from the right portion of the upper lip to the ipsilateral cheek region, with exposure of the oral mucosa. The wound was thoroughly cleaned, local anesthesia was applied, and it was sutured using Vicryl 4-0 along the wound edges." Medical

treatment included two subsequent follow-ups for suture removal (lacking medical assessment of the scarring process), pharmacological treatment (500 mg cloxacillin and 500 IU bacitracin with neomycin 15 gr), and the following instructions: application of argan oil, animal fat oil (e.g., emu oil), or rosehip oil, and physiotherapy for scar management, which was not completed within the public health system.

Five weeks after the event, due to speech difficulties resulting from the trauma, the subject decided to seek private speech-language therapy assistance. During the initial interview, the subject reported difficulties in tasks such as eating and brushing his teeth. Additionally, he mentioned constantly covering his mouth due to the negative impact the scar had on his body image. Effects on speech, feeding, social, and emotional aspects were also observed. Concerning the above, the service user expressed concern about the lack of job opportunities available to him as a consequence of these disturbances, since they hindered his ability to speak and smile as he did before the trauma occurred.

Initial Speech-Language Therapy Assessment

The speech-language therapy assessment was documented using the adapted version of the MBGR Protocol of Orofacial Myofunctional Evaluation, Rafael González's *Protocolo de Evaluación del Habla* (oral motor control and articulation section), the Numerical Pain Rating Scale (NPRS), and photographs.

The findings (detailed in Table 1) were as follows: A hyperpigmented and hardened pathological scar is observed in the lower right facial third, located in the lip and cheek regions. This tissue extends from the base of the orbicularis oris muscle in the upper lip (UL), tubercle, labial philtrum, base of the nasal wing, major and minor zygomatic muscles, risorius muscle, to the labial commissure (Figure 1). In addition, poor oral health was observed due to some dental pieces missing in both arches (a pre-existing condition before the facial trauma), pain in the affected area, and a decrease in the range of orofacial movements, leading to dysfunctions in chewing, swallowing, speech, and facial expression.

Based on the assessment, the subject was diagnosed with orofacial myofunctional disorder secondary to facial soft tissue trauma, caused by a human bite. Due to the characteristics of the case, he was referred to psychology, dental medicine, and dermatology.

Table 1. Findings from the Initial Speech Therapy Assessment

Evaluated Aspects	Findings
Structure	- Hypertrophic scar in the lower third of the face, right lip, and cheek region. Increased adherence in the philtrum and labial commissure (retracted). Edema in the cheek region. Dry external lip mucosa (ELM), swollen and reddened internal lip mucosa (ILM). Lip asymmetry at rest. - Poor oral health, with missing dental pieces in quadrant 1. Undetermined type of occlusion.
Mobility Tone	- Difficulty in lip protrusion, lateralization, and retraction. Inability to perform cheek movements (puffing, suction). - Reduced mouth opening with deviation to the right. - Mild hyperfunction in the right masseter and hypofunction in the upper portion of the right orbicularis oris.
Sensitivity Pain	- Pain Level: 7-8 (NPRS) in philtrum, lip tubercle, and nasolabial groove. - Reports mild loss of sensitivity in the upper lip (UL).
Orofacial Functions	- **Swallowing:** Incomplete lip seal and anterior loss of liquids and semisolids. Mild contraction of the mentalis muscle. - **Chewing:** Unilateral chewing pattern predominantly on the left side, decreased speed, left lateral incision, and inconsistent lip seal. - **Speech:** Reduced oral opening and limited lip movement. Impaired articulation of bilabial phonemes and open vowels. - **Facial Expression:** Asymmetrical and limited smile and laughter range.

Speech-Language Therapy Intervention

Regarding the intervention, the approach primarily focused on scar management, the affected oral functions, and awareness of the issue. The orofacial myofunctional intervention consisted of 10 weekly sessions lasting 30 to 45 minutes. A mid-therapy evaluation was carried out after 5 sessions to assess progress. Each session aimed to work on the following therapeutic pillars:

1. Awareness of the presence of scar tissue and its interference in the execution of movements in the affected orofacial functions: The patient was informed about the impact of the

scar tissue on the muscles and functions of the affected facial region using biofeedback (mirror), a resource that was employed throughout the functional training (Trawitzki et al., 2019).

Table 2. Results of the Mid-Therapy and Final Speech Therapy Assessments.

Evaluated Aspect	Findings	
	Mid-Therapy	**Final**
Structure	- Decreased adherence in the right labial commissure. - Reduction in edema, dryness of ELM, and redness of ILM. - Lip asymmetry at rest.	- No edema or redness in ILM. Maintains dryness of ELM. - Decreased lip asymmetry at rest.
Mobility Tone	- Increased amplitude in lip protrusion and retraction. Achieves cheek movements (puffing, suction) in a short period. - Increased mouth opening (deviation to the right). - Slight hyperfunction of the right masseter and hypofunction in the right orbicularis oris.	- Adequate amplitude in lip protrusion, retraction, and cheek movements (puffing, suction). - Adequate mouth opening (slight deviation to the right). - Decreased hyperfunction of the right masseter and hypofunction of the right orbicularis oris.
Sensitivity Pain	- Pain level 3-5 (NPRS) in the philtrum, lip tubercle, and nasolabial fold. - Reports increased sensitivity in the upper lip.	- No pain in philtrum, lip tubercle, or nasolabial fold, and reports appropriate sensitivity.
Orofacial Functions	- **Swallowing:** Inconsistent lip seal and complete retention of food. Mild contraction of the mentalis. - **Chewing:** Unilateral chewing pattern predominantly on the left, decreased speed, predominantly lateral incision, systematic lip closure. - **Speech:** Increased mouth opening and reduced lip movement. Decreased articulatory imprecision in bilabial phonemes and open vowels. - **Facial expression:** Asymmetrical and wider smile and laughter.	- **Swallowing:** Consistent lip seal and complete retention of food. Mild contraction of the mentalis. - **Chewing:** Unilateral chewing pattern predominantly on the left, adequate speed, central incision, systematic lip closure. - **Speech:** Articulatory precision in bilabial phonemes and open vowels. - **Facial expression:** Reduced asymmetry in smile and laughter, increased amplitude.

2. Massages for scar flexibility, adhesion reduction/prevention, and intra/extraoral elongation (according to tolerance): Relaxation massages were performed on the orbicular and cheek muscles affected by scar formation. To release scar tissue, promote its elasticity, and consequently enhance the mobility of the affected musculature, deep intra/extraoral massage was carried out. Using the fingertips of the index and thumb (forming a pincer to facilitate scar elongation), contact was maintained on the surface, and strong digital pressure was applied from the center to lateral areas, moving slowly in the direction of muscle fibers, and respecting the direction of the scar along its entire length (Melo, 2004, 2021; Nunes, 2019). Friction massage was also performed to reduce adhesions near the right labial commissure and labial philtrum. This involved short, localized, and penetrating movements in a circular motion (Melo, 2021). Five sets of 8-10 repetitions in the cheek and labial regions were recommended for both types of massage. Both techniques were performed according to the subject's tolerance, using medically recommended lotion. Regarding frequency, the service user was instructed to perform the massages and exercises three times a day, before his main meals, to facilitate mobility in the functions involved in oral feeding.
3. Intervention of the affected oral functions (swallowing/chewing/speech) and resting position: The habitual positions of the jaw, lips, and tongue were trained.

For the chewing function, larger and harder foods were gradually introduced according to the patient's tolerance. However, due to unfavorable oral health conditions, it was not possible to modify his chewing pattern. For swallowing, therapy focused on maintaining effortless lip seal. Regarding speech, exercises were carried out aiming at word production, prioritizing the articulation of open vowels and bilabial phonemes. This was achieved through the repetition of words, sentences, and accounts relevant to the patient, related to leisure and work.

Figure 1. Photographs of the Initial Speech Therapy Evaluation.

Figure 2. Photographs of the Initial, Mid-Therapy, and Final Speech Therapy Evaluations.

4. Orofacial and facial expression training: Isotonic exercises were conducted, including the use of a lip resistance plate, with 5 sets of 8 to 10 repetitions. Laugh and smile movements were prompted. Additionally, the patient was instructed to have a daily routine of carrying out selected exercises at home, based on each session.

Evaluation of Progress

Mid-therapy and final assessments were conducted to observe progress and the subject's perception of the issue compared to the initial evaluation (see Table 2).

In the final evaluation, a pink scar and an increase in tissue flexibility were evident, along with a reduction in adherence at the labial commissure and, to a lesser extent, at the labial tubercle (Figure 2). Improved symmetry was observed in the nasolabial groove and upper lip at rest and during oral functions. A more consistent lip seal was observed, along with increased mouth opening and chewing speed, achieving a central incision, and the chewing pattern showed a posterior left-side predominance (hindered by the absence of dental pieces).

The patient reported being able to ingest a greater variety of foods with different consistencies, with no food residues remaining in the vestibule. He did not experience pain upon touch and noted increased sensitivity in the upper lip, occasionally mentioning itching. Regarding speech, he stated feeling less tension, which

helped him speak better, positively impacting his self-esteem, communication, and motivation in the workplace. He expressed satisfaction with the results and decided not to continue with therapy sessions due to scheduling conflicts with his job. A total of 10 speech-language therapy sessions were conducted. In an attempt to provide treatment continuity and enhance achievements, a follow-up session was scheduled one month after finishing therapy. However, the subject did not participate in this process, reiterating his satisfaction with the therapy outcomes. Regarding the referrals, the patient reported not having been able to secure appointments with the suggested specialists.

COMMENTS FROM THE AUTHORS

The results of the intervention indicate that, although working on muscle function is not the primary objective of therapy, addressing it proves to be essential to improve the movements required for oral functions. This is because working on orofacial muscle functionality helps preserve and/or promote scar elasticity, preventing the retraction and adhesion that could lead to a decrease in the mobility needed for related oral functions. On the other hand, when there is no direct intervention to halt the development of pathological scarring, muscle deterioration tends to occur (Melo, 2019).

The speech-language therapy intervention exposed in this article was planned following therapeutic objectives. Said objectives are grounded in the existing literature, which emphasizes the need to recover the movement and functions of the stomatognathic system according to each case (Trawitzki et al., 2019) and to maintain scar tissue elasticity and prevent contractions (Melo, 2021). This is to ensure the mobility of the orofacial musculature involved in impaired stomatognathic functions.

Firstly, the intervention aimed to address the scar tissue in order to achieve labial symmetry at rest and function. This was done through manual techniques such as deep sliding and friction massage, including strategies for self-perception and automation of habitual lip posture. This intervention enhanced symmetry, with direct results in facial aesthetics and lip function in the patient's oral functions.

Additionally, muscle actions were used by executing adaptive oral motor functions classified by Douglas (2002) to increase muscle resistance, thus improving range of motion. The positive results of this intervention are clearly observed when comparing mid-therapy and final photographic records, demonstrating an increase in the range of cheek and lip protrusion/retraction movements.

Regarding functional outcomes, it was found that for swallowing, the patient achieved a more competent lip seal. It is worth noting that while improvement in masticatory function, specifically in speed, consistent lip closure, and central incision were observed, the subject maintained a predominantly unilateral pattern due to the deficient dental condition prior to facial trauma. Regarding speech, the training of bilabial phonemes had a positive impact on articulatory precision. It is important to highlight that the patient's inability to access multidisciplinary services to consult with other specialists, which aimed at comprehensive work in the management of his facial trauma, was considered one of the limitations in optimizing the speech-language therapy intervention.

The interventions and the frequency of the exercises prescribed in therapy, which began 5 weeks after the trauma, had a positive effect on the flexibility of the scar. These results align with Vincent et al. (2019), who indicate that regular massage starting 3 or more weeks after surgery can help soften facial scars and prevent hypertrophy and contraction. The favorable outcomes of the speech therapy approach in scar management presented in this study proved it to be an appropriate conservative treatment. Therefore, it becomes evident that the process of planning this type of intervention should not only consider anatomofunctional aspects of the stomatognathic system, but also include strategies for orofacial functions and scar management.

It is noteworthy that a follow-up was deemed necessary for treatment continuity and to prevent retractions and tissue adhesions, considering that the scar remodeling stage lasts a year or more. Therefore, monitoring the case throughout this period was considered crucial to assess the maintenance of achieved outcomes and the evolution of potential mobility restrictions. However, due to scheduling conflicts and the subject's improved condition post-intervention, he disengaged from therapy.

There is a limited number of studies in the literature on the speech-language therapy approach to facial trauma (Câmara et al., 2023), and there are few that describe the impact of speech-language therapy on scarring processes in facial soft tissue traumas. Consequently, we believe it is important to disseminate this work due to the uniqueness of the case, its results, and the relevance of speech therapy intervention in scar tissue. The results of this study align with favorable outcomes observed in previous research measuring the effectiveness of speech-language therapy management in scarring processes.

For instance, Clayton et al. (2015) mention some studies that address scar management of various etiologies at the international

level, particularly in post-burn orofacial contracture. They mention the use of a combined regimen of exercises and active stretches that result in significant improvements in oral opening amplitude. Similarly, a study by Bianchini et al. (2004) on maxillofacial trauma used a treatment protocol focused on mandibular mobility, muscle preparation with thermotherapy, massages, stretches, and specific maneuvers addressing posture symmetry and functional stability. They conclude that speech-language therapy intervention serves as a conservative treatment in these cases.

In their study on myofunctional therapy for second and third-degree orofacial burns in Chile, Pavez (2018) describe that the use of active orofacial exercises, digital manipulation techniques, and massage therapy increases both vertical and horizontal oral opening, facial expression mobility, and reduces self-perceived tissue retraction. Guzmán & Rimassa (2021), in a case study on craniofacial soft tissue trauma, describe the use of mixed orofacial motor skills techniques, including massages for muscle balance, digital scar manipulation, functional training, and active orofacial exercises, resulting in significant improvements.

Regarding the study's limitations, it should be noted that the duration of the treatment was restricted, preventing the comprehensive follow-up of the patient throughout the process of scar tissue maturation. This hindered the achievement of all the goals set at the beginning of the speech therapy treatment plan. These goals aimed at continuing to favor scar elasticity to prevent contractions and ensure the proper execution of orofacial functions. However, as previously mentioned, the subject decided to end the process prematurely. This decision was based on his satisfaction with the achieved goals, stating that the quality of his life had positively changed with the intervention.

Another limitation of this study is related to the instruments used for the initial and mid-therapy evaluations. In this clinical case, scar measurement scales were not applied, relying solely on observation by speech-language therapy to describe the scar. However, the medical literature describes two scar assessment scales, namely the Patient and Observer Scar Assessment Scales (POSAS) and the Vancouver Scar Scale (VSS). Both involve subjective observations about scar appearance. But applying these scales requires training, and they are mainly used in burn patients. Moreover, these scales do not include scoring strategies for the oral myofunctional disturbances found in these cases (Magnani et al., 2019). Therefore, the reported results are observational and qualitative, taking into account the patient's self-perception and his motivation to seek speech-language therapy assistance. Additionally, the subject's self-reported satisfaction and his perception serve as indicators of therapy success. Nevertheless, systematizing the application of objective instruments could provide quantifiable results in assessing progress.

A final limitation pertains to the referrals made to other healthcare professionals and the interdisciplinary care network. The patient was referred to dental medicine and dermatology due to his impairments and their impact on his orofacial functions. However, as he was affiliated with FONASA, he faced difficulties accessing evaluations with these professionals, which prevented him from completing the referral. Furthermore, by prematurely discontinuing speech-language therapy, the opportunity was missed to emphasize the importance of dental treatment for maintaining the achieved therapy results.

GENERAL CONCLUSIONS

This work shows that documenting, describing, illustrating, and disseminating the management of facial trauma requires an interdisciplinary approach, which must include a speech-language therapist specializing in orofacial myofunctional disorders, with an active role in the interdisciplinary team. Speech-language therapists are essential professionals in the rehabilitation process.

Furthermore, the results presented in this article show that in cases of facial trauma and the acute phase of scar formation, where there is no muscle involvement, the speech-language therapist should consider treatment that does not necessarily rely on muscle training exclusively. Instead, the intervention should focus on manual therapy for the scar tissue, to promote elasticity and reduce adhesion to prevent muscular consequences such as decreased size, mobility, and strength in the execution of orofacial functions.

It should be noted that it is not possible to generalize the results of this study, since they are specific to the exposed case. However, since the results of early speech-language therapy intervention in facial soft tissue trauma with a specific etiology and its subsequent scar formation were positive, it is projected that further studies delve into this line of research.

Finally, this work aims to contribute to the medical-therapy community in our country. It does so by highlighting this area of speech-language therapy practice and the positive impact it has on patients who experience functional orofacial impairment due to facial trauma. This, in turn, impacts their activity and participation in various contexts.

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