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Minor Surgery with Major Impact; Correction of Patients with Facial Paralysis in Local Anesthesia

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Abstract

Background: Facial Palsy (FP) often includes aesthetic and functional impairment. Minor surgery performed in Local Anesthesia (LA) is a safe way to treat asymmetry and functional concerns, either as enhancement of existent postoperative results or as primary treatment. Although patients with FP are challenging to treat, numerous improvements can be performed in LA.

Material and Methods: From February 2016 to April 2021, 93 patients with FP were treated in LA. Treatments targeted asymmetries, ocular and oral deficiencies. Eleven cases were combined with injection treatment, either with Botulinum toxin type A, hyaluronic acid, or both.

Results: Significant functional changes were primarily observed in patients with ophthalmological and oral symptoms. Aesthetic improvement was observed in a majority of patients. Six cases presented with complications, of which all were associated with ophthalmological symptoms.

Conclusion: Overall results imply that minor surgery performed in LA is a safe way to obtain satisfactory functional and aesthetic outcomes with low complication rates. Besides logistic advantages and cost efficacy, functional and esthetical improvement is achieved safely in an elderly population often associated with high morbidity.

Consequently, we suggest incorporation of minor surgery either as adjunctive therapy to primary repair of facial palsy or as main treatment for optimal outcomes.

Keywords: Facial palsy; Minor surgery; Local anesthesia; Asymmetry

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Introduction

Facial Palsy (FP) is a debilitating condition that may have a substantial impact on quality of life. Etiology of peripheral FP is multifactorial and may be due to infection, trauma, vascular anomaly or tumors [1,2]. Disability due to FP may present itself as functional, aesthetic or a combination of the two. The severity and symptomatology of FP is diverse, with various degrees of hypoactivity, hyperactivity, synkinesis, gustatory epiphora, and facial discomfort as well as impairment of essential facial functions such as closure of the eyelid and mouth. This can result in compromised non-verbal communication due to lack of facial expression. Difficulties with pronunciation and drooling are frequent and not always possible to resolve with physical therapy.

Besides physiological impairment, associated psychosocial stress and depression is often present [3-6]. When medical treatment is insufficient, a variety of surgical options may be considered [7-10]. While several standard surgical treatments are available [11], ranging from advanced facial reanimation procedures to static procedures aimed at restoring facial symmetry at rest, the use of adjunct therapies such as minor surgery in LA, botulinum and hyaluronic acid injections, may also improve function and aesthetics for this group [12]. Yet, this has not been entirely studied for FP patients and is perhaps not as well established.

To address this, our center has established a specialized minor surgery outpatient department for patients with facial palsy. This unit employs multiple minor procedures as an option in the management of FP. The patients whom are often elderly and not suitable candidates for major surgery, may be aided by effective and safe treatment in LA. Yet, current literature lacks comprehensive analyses of larger case series addressing the use of minor surgical procedures such

Table 1: Demography of patients.

Gender	n	Percentage of total number of patients	Age Range	Mean Age
Female	52	56	19-91	63
Male	41	44	26-90	72
Total	93	100	19-91	67

as placement of internal gold eyelid weights, medial tarsorrhaphy, blepharoplasty, canthopexy etc. as well as injection treatment in the management of FP.

Hence, this retrospective study outlines the use of minor surgical procedures and injection treatment in the management of FP patients to determine their outcomes, efficacy and complication rates. Through examining patient demographics, FP etiology, procedures, complications, and outcomes, we aim to clarify the role of these interventions in clinical practice.

Material and Methods

Ninety-seven patients were included in this study. All patients received a letter asking for informed consent. Sixteen patients were deceased by the time of spring 2021. Seventy-seven patients (79%) returned a letter with consent. Ninety-three patients were finally included from February 2016 to April 2021 and were treated with minor surgery, adjunctive treatment or a combination of the two at our unit. 52 were females, 41 males (age range 19-91 years, mean age 67 years). Patients were operated in LA with or without oral intake of Midazolam.

Charts were reviewed to collect demographic data, treatments performed, etiology of their facial palsy as well as complications, and treatment outcomes. Data on type or types of procedures, whether or not performed at multiple occasions was collected. Complications within 12 months were documented.

All patients were treated in an outpatient department were three to five patients were managed within the scope of a 4 h to 5 h period. Procedures performed included: Medial or lateral tarsorrhaphy, insertion or removal of submuscular eyelid weight, skin excision of the nasolabial fold, eyebrow lift, upper and/or lower blepharoplasty, wedge excision of the lower eyelid, lateral canthopexy, dermal fat graft and injection of Botulinum toxin type A (BOTOX®, Abbvie) and/or hyaluronic acid (Restylane®, Galderma).

The eyelid weights, either platinum or gold, were placed between the levator aponeurosis and the orbital inner septum [13]. The weights ranged between 1.0 gr to 2.0 gr.

Data on patient characteristics, their interventions, and the associated outcomes are presented as percentages and as either means or medians, as deemed appropriate depending on the nature of the data.

Ethics

Ethical approval was obtained by our National Ethics Review Committee (dnr 2020-03539). All participants were informed and written consents were obtained.

Results

Females were slightly overrepresented (56%) compared to men (44%) (Table 1). The patients ranged from 19 to 91 years (mean age 67 years). Patients that were deceased before they could give informed consent had a higher mean age (76 years), compared to the whole group and had a higher percentage of malignant tumors. Average age of patients that were alive during the full course of the data collection was 65 years (77 patients, 83%).

A total of 93 patients were treated across 27 diagnoses resulting in their FP (Table 2). Parotid tumors (21 cases) and Bell's palsy (21 cases) were the most common causes of FP, with ocular symptoms being the primary indication for their treatment. Patients with least common causes for their FP included accidental perioperative FP (1 case) and stroke (1 case).

The patients with the highest mean age were gingival cancer (90 years) and tonsil cancer (84 years) (Table 3). This may be explained by the fact that there was only one patient for each of these diagnoses. This is also explicable for the two youngest cases and diagnosis, as there was only one case of astrocytoma (36 years) and one case of

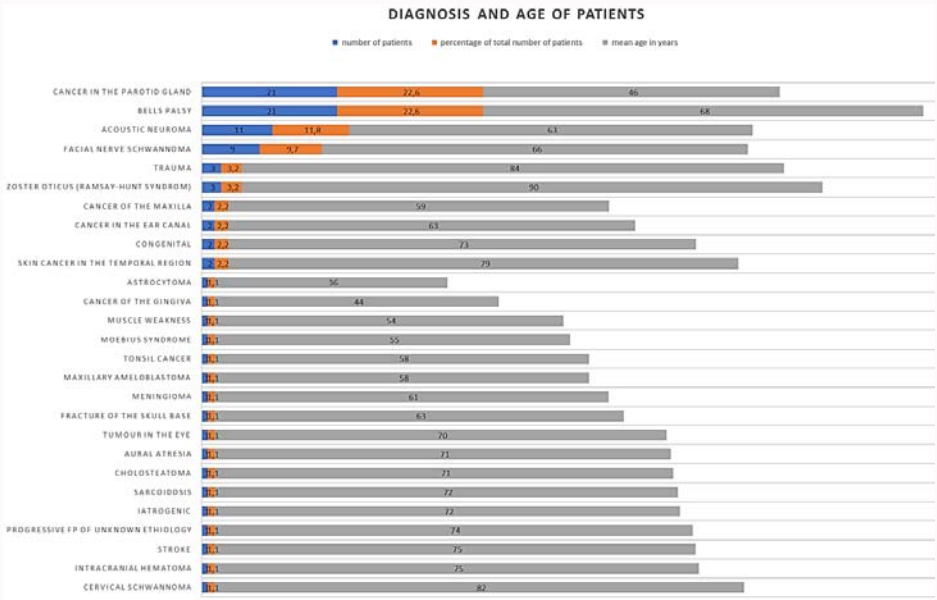

Table 2: Distribution of treated conditions and average age of patients per diagnosis.

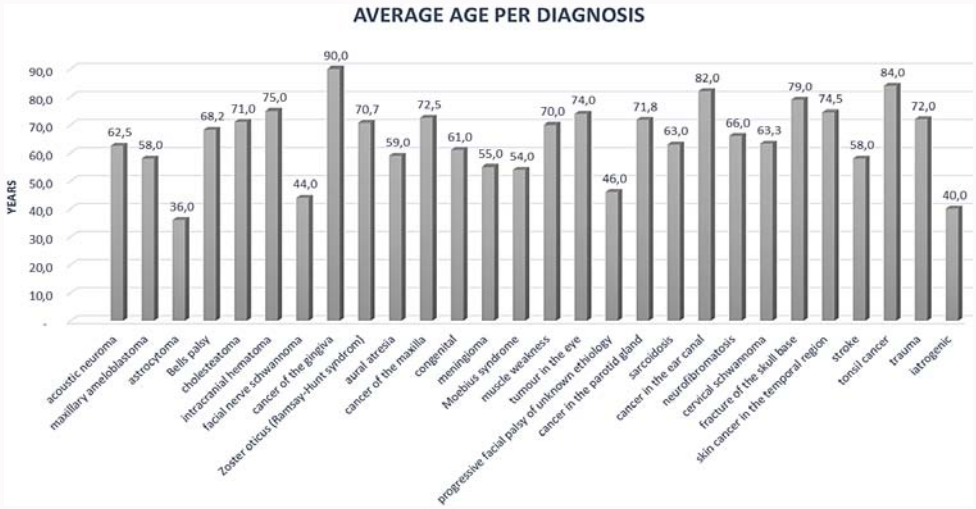

Table 3: Average age per diagnosis.

Table 4: Non-surgical causes of FP.

Etiology	n	% of total patients	Mean age
Bell's palsy	21	22.6	68
Herpes zoster	3	3.2	90
Trauma	3	3.2	84
Congenital malformation	2	2.2	73
Moebius syndrome	1	1.1	55
Muscular impairment	1	1.1	54
Facial palsy of unknown origin	1	1.1	74
Sarcoidosis	1	1.1	72
Stroke	1	1.1	75
TOTAL	**34**	**36.6**	**72**

iatrogenic FP (40 years). As previously stated, Parotid tumors and Bell's palsy were most frequent in our cohort accounting for 21 cases each, and their mean age were 68 years and 46 years respectively.

In 34 (37%) of the cases the etiology of FP was either congenital or acquired but otherwise not related to surgery (Table 4). In the remainder of the cases 59 (63%), the etiology of FP was the result of tumor surgery.

Surgical treatment

A total of 186 operations were performed at 118 surgical occasions. The number of procedures ranged from one to four procedures per patient for each surgical occasion (Table 5). Patients with total facial palsy were more frequently treated each occasion and in addition to this, they required more than one surgical occasion. Parotid tumors

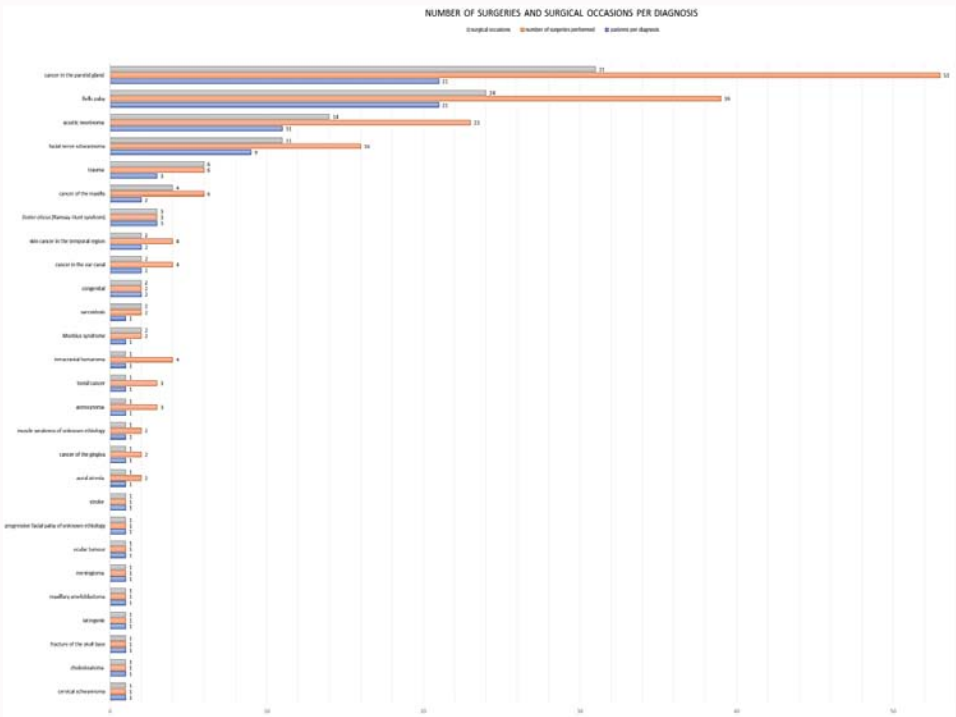

Table 5: Surgical treatment and number of surgical occasions per diagnosis.

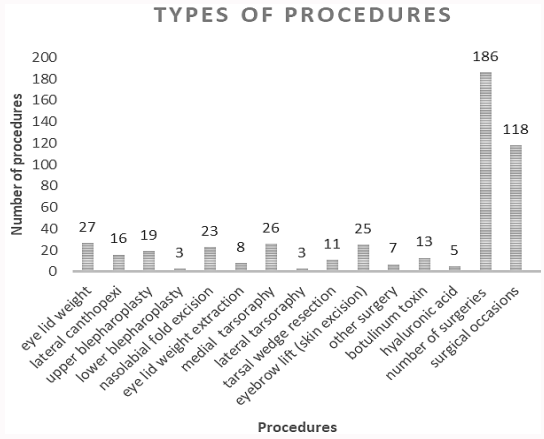

Table 6: Types of surgical surgeries performed.

required a substantial number of surgical operations (n=53) and surgical occasions (n=31), indicating the complexity of treatment for this diagnosis. Similarly, Bell's palsy resulted in 39 operations and 24 surgical occasions, highlighting the demand for interventions to address this common cause of facial palsy.

Acoustic neurinoma (n=11) and facial schwannoma (n=9) were less frequent as underlying cause of FP in this material, yet they required a considerable number of surgical interventions, with 23 and 16 surgeries performed respectively.

Types of procedures

The most common types of treatment were those targeting ocular symptoms (Table 6). There were 27 cases were treated with eyelid, 26 cases treated by medial tarsorrhaphy and 25 patients treated with eyebrow lift.

Injectables

Seventeen patients were treated with injectables in addition to their surgical treatment (Table 7). Eleven of these cases were treated with Botulinum toxin type A (BOTOX®, Abbvie). Three cases were treated with Restylane. Two cases combined Botox and Restylane and 3 cases were treated with Restylane solely. Bell's palsy was the diagnosis treated most frequently (six cases), followed by acoustic neurinoma (three cases). Parotid cancer was the condition which was most treated with Restylane (three cases).

Complications

Complications occurred in six cases (3%) (Table 8). Five of these complications were related to eyelid weight surgery. Of these five, three cases presented with extrusion of the eyelid weight. Two cases had to undergo revisional surgery where the weight of the implant was altered. The sixth case presented with a wound problem following medial tarsorrhaphy.

Discussion

Current literature has outlined therapeutic strategies for FP, yet most of it focus primarily on existing treatment [7-11]. Although FP patients may be challenging to treat due to their asymmetry and functional symptoms, there are several improvements that can be performed non-surgically or in LA [11]. Modern surgery tends to perform dynamic reconstruction with simultaneous nerve repair during the actual tumor resection [9] but with an unfortunate simultaneous loss of the facial nerve. Yet, this type of major surgery

Table 7: Injectable treatments.

Diagnosis	Average age	Botox treatment	Restylane treatment
Acoustic neurinoma	76	3	1
Bell's palsy	61	6	
Facial nerve schwannoma	52	1	
Cancer of the gingiva	90		1
Meningioma	55	1	
Cancer of the parotid gland	62	1	3
Schwannoma facial	62	1	
Total	**65**	**13**	**5**

Table 8: Complications due to surgeries performed.

Diagnosis	Age	Number of surgeries	Surgical occasions	Type of complication
Bell's palsy	78	2	1	Wound complication.
Facial schwannoma	52	2	1	Gold weight extrusion.
Cancer of the gingiva	90	1	1	Gold weight extrusion.
Parotid cancer	78	2	1	Gold weight extrusion.
Parotid cancer	88	5	3	Gold weight alteration.
Trauma	74	1	1	Gold weight alteration.

often requires additional minor corrections, which can be performed in LA. Minor surgery performed in LA as described in this study, is a safe way to address asymmetry and may resolve functional concerns, either as enhancement of existent postoperative results or as main treatment.

Comprehensive analysis of case series addressing the use of minor surgical treatment in the management of FP is still quite limited. Our findings present the diverse nature of FP and how these symptoms can be treated in LA in a safe and efficient way, with low complication rates.

When considering the entire cohort in this study, the overall mean age was relatively high (67 years). This aligns with existing literature indicating a higher prevalence of FP among older adults [14]. Older patients with FP may be challenging to treat as they often face challenges in terms of their overall health [15,16], such as in this study, in which majority of the cases have FP due to various forms of cancer. Older individuals are typically more susceptible to complications associated with general anesthesia and major surgeries [16,17].

Consequently, providing older patients surgical options in LA may reduce the risks associated with general anesthesia and is therefore also suitable for individuals with multiple comorbidities. In addition, when treating elderly patients with poor prognosis masseter nerve surgery and/or cross face nerve graft may not be suitable [9]. Since minor surgeries are conducted in an outpatient setting, there is no need for prolonged hospitalization, decreasing the risk of nosocomial infections and promoting faster recovery times.

In addition to minor surgical procedures, adjunctive treatments such as botulinum toxin and hyaluronic acid injections may address specific facial asymmetries and functional deficits in older patients with FP [18]. These injectables can be administered in an outpatient setting without the need for sedation or general anesthesia, further

reducing the procedural risks associated with more invasive interventions.

Also, surgeries performed in local anesthesia offers several other logistical advantages, including their suitability for training residents, cost-effectiveness. Therefore, this type of treatment modality can be offered in smaller units and outpatient clinics as opposed to more conventional surgical treatment of FP, which often is performed in larger hospitals.

Among the diagnoses contributing to facial palsy, parotid tumors and Bell's palsy emerged as the most prevalent in our study, each accounting for 21 cases. Parotid tumors required a substantial number of surgical operations (n=53, 29%) and surgical occasions (n=31, 26%), indicating the complexity of treatment for this diagnosis. Similarly, Bell's palsy required n=39 (21%) operations and n=24 (20%) surgical occasions.

Acoustic neurinoma and facial schwannoma were also frequent, with 11 and 9 cases, respectively. While these diagnoses were less frequent compared to parotid tumors and Bell's palsy, they still required a considerable number of surgical interventions, with 23 and 16 operations performed, respectively. These findings demonstrate the diverse etiology of facial palsy and the need for personalized treatment approaches based on the underlying diagnosis. While some diagnoses may require extensive surgical interventions, others may benefit from minor surgery or non-surgical treatment.

The analysis of surgeries performed per diagnosis revealed variations in the extent and frequency of surgical interventions required for different etiologies of FP. Also, the distribution of surgeries across different diagnoses represents the heterogeneity of FP and their etiology.

According to our initial hypothesis, total FP did correlate with a higher frequency of surgical procedures required. This suggests that the extent of surgical intervention is influenced by the degree of FP. Interestingly, procedures targeting ocular symptoms, such as eyelid weight insertion and tarsorrhaphy, were among the most frequently performed surgeries, reflecting the functional significance of eyelid closure and ocular symptoms [19].

Nonsurgical adjunctive treatments such as and botulinum toxin may address issues such as periocular synkinesis, platysmal hypertonicity and mentalis muscle dimpling [20]. Hyaluronic acid injections may also be used to enhance lip closure and improve symmetry. Furthermore, Botox and Restylane injections can be personalized to target specific muscle groups or facial areas affected by synkinesis, hypertonicity, or volume loss, providing specific functional and aesthetic improvements while minimizing recovery periods [12,20].

Bell's palsy emerged as the most common diagnosis treated with Botox injections, highlighting its efficacy in addressing hyperactivity-related symptoms such as synkinesis. Conversely, Restylane injections were predominantly used in cases of parotid tumors, which often present with oral symptoms and a total FP. This demonstrates the versatility of adjunctive treatments in targeting specific functional deficits associated with different etiologies of FP [18].

In terms of complications, extrusion of eyelid weight was the most frequent problem, which is in concordance with previous findings [21,22]. The findings reveal that complications related to eyelid weight placement in facial palsy patients primarily involve issues with eyelid weight extrusion or improper amount of weight. Overall, while complications can occur, the benefits in treating ocular symptoms must be weighed against the potential risks [19], especially in patients with underlying health conditions or lifestyle factors, such as smoking. Although this study not a randomized trial with control groups, our study supports the use of surgical procedures performed in LA combined with injectables when necessary, in the management of patients with FP. However, future studies with larger sample sizes and longer follow-up periods are warranted to further support our findings. Other outcomes of interest that need further clarification, is the long-term efficacy as well as more specified analysis of functional and aesthetic impairments before and after intervention.

In conclusion, our retrospective study demonstrates advantages in logistics and cost efficacy in the treatment of FP. Minor surgeries performed in LA may improve functional and esthetical outcomes in a safe way with low complication rates among a population often associated with high age and comorbidities.

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