UNIVERSIDADE DE LISBOA
FACULDADE DE MEDICINA LISBOA

TRABALHO FINAL
MESTRADO INTEGRADO EM MEDICINA

Clínica Universitária de Estomatologia

Postoperative recovery after TMJ arthroscopy: a prospective study. Preliminary results

Carlos André Prior Antunes

Orientado por:

Prof. Doutor David Faustino Ângelo

JULHO'21

Resumo

Contexto: A artroscopia da articulação temporomandibular (ATM) tem ganho popularidade no tratamento das Disfunções Temporomandibulares pelos seus resultados satisfatórios a longo termo, segurança, menores incisões cirúrgicas e recuperação mais rápida. Contudo, a recuperação pós-operatória está pouco estudada e as orientações pós-operatórias têm falta de evidência científica.

Metodologia: Estudo prospetivo que inclui doentes submetidos a artroscopia da ATM, de 1 de novembro de 2020 a 30 de abril de 2021, e avalia *outcomes* relacionados com dor e desconforto durante a recuperação no primeiro mês pós-operatório.

Resultados: Nove doentes foram incluídos no estudo, todas mulheres (100%), com idade média de 31.67 ± 12.51 anos (16-54 anos). Foram encontrados efeitos significativos ao longo do tempo para dor da ATM em repouso (p<0.001), a falar (p=0.002) e a mastigar (p<0.001), para fadiga da ATM durante a mastigação (p=0.001), desconforto da ATM durante a abertura da boca (p=0.006) e sono (p<0.001), e desconforto para a mastigação de todos os alimentos estudados (p<0.001). No D30, a satisfação dos doentes para o alívio dos sintomas foi 7.78, para a função mastigatória foi 8.88 e para as expectativas pré-operatórias foi 8.11.

Conclusões: A dor da ATM tornou-se praticamente nula a D9 para repouso e discurso, e a D24 para mastigação. A fadiga e o desconforto durante as atividades essenciais tornaram-se ligeira/moderada a D9. Os autores acreditam que os doentes a recuperar de artroscopia à ATM sentir-se-iam confortáveis para introduzir dieta mole a D6, escalar gradualmente a rigidez de 3 em 3 dias e introduzir maiores calibres a D15. Doentes deverão ser capazes de recomeçar a atividade profissional a D15 e atividades físicas de moderada intensidade a D21. A D30, relataram elevados níveis de satisfação com esta intervenção minimamente invasiva, que não só apresenta um menor impacto no pós-operatório imediato, como ainda revelou excelentes resultados no final do *follow-up*.

Palavras-chave: Cirurgia da ATM, artroscopia da ATM, recuperação pós-operatória, satisfação pós-operatória.

Abstract

Background: Temporomandibular joint (TMJ) arthroscopy has become popular for the treatment of Temporomandibular Disorders, due to its satisfactory long-term results, safety, smaller incisions, and faster healing. However, the postoperative recovery of these patients is poorly studied and clear postoperative orientations lack of scientific evidence.

Methods: Prospective study including patients submitted to TMJ arthroscopy, from November 1st of 2020 to April 30th of 2021, evaluating multiple outcomes related to pain and discomfort during the first-month postoperative recovery.

Results: Nine patients were enrolled in this study, being all women (100%) with a mean age of 31.67 ± 12.51 years old (range 16-54 years old). Significant effects across time were found for TMJ pain at rest ($p < 0.001$), during speech ($p = 0.002$) and mastication ($p < 0.001$), for TMJ fatigue during mastication ($p = 0.001$), for TMJ discomfort during mouth opening ($p = 0.006$) and sleep ($p < 0.001$) and for discomfort for the mastication of all foods studied ($p < 0.001$). At D30, the patients' satisfaction was, on average, 7.78 towards symptoms' relief, 8.88 towards masticatory function, and 8.11 towards preoperative expectations (on a scale from 0 to 10).

Conclusions: TMJ pain became practically null at D9 for rest and speech, and at D24 for mastication. Fatigue and discomfort during essential activities became mild/moderate at D9. The authors believe patients recovering from TMJ arthroscopy would feel comfortable to introduce soft diet around D6, gradually scale foods' hardness every 3 days and introduce foods with a higher caliber on D15. Patients should be able to restart professional activity on D15 and moderate-intensity exercises after D21. At D30, the participants reported high levels of satisfaction with this intervention, reflecting how this minimally invasive technique can achieve great results while having a lower impact on the patients' recovery.

Key words: TMJ surgery, TMJ arthroscopy, postoperative recovery, postoperative satisfaction.

INDEX

INTRODUCTION

Temporomandibular Disorders (TMD) represent a group of pathologies that affect the temporomandibular joint (TMJ), the masticatory muscles and/or its surrounding structures (Liu & Steinkeler, 2013) (De Rossi, Greenberg, Liu, & Steinkeler, 2014). TMD are associated with multifactorial etiology (Locker & Slade, 1988) (Suvinen, Reade, Kemppainen, Könönen, & Dworkin, 2005) (Liu & Steinkeler, 2013) (De Rossi, Greenberg, Liu, & Steinkeler, 2014) (Ângelo D. F., 2018). These disorders have a prevalence that can range from 5% to 34% (Nourallah & Johansson, 1995) (Schiffman, et al., 2014) (De Rossi, Greenberg, Liu, & Steinkeler, 2014) (Ângelo D. F., 2018), with a peak of incidence between 20 and 40 years of age (Liu & Steinkeler, 2013). TMD correspond to the main cause of orofacial pain by non-dentary etiology (Ângelo, et al., 2016).

Depending on the TMD and on its severity, different therapeutic approaches are available, ranging from medical treatment, through TMJ arthrocentesis, arthroscopy, open surgery, and total alloplastic joint replacement (Dimitroulis, 2013) (Liu & Steinkeler, 2013) (Chowdhury, Saxena, Rajkumar, & Shadamarshan, 2019).

TMJ arthroscopy is a minimally invasive procedure that allows direct visualization of the joint and surgical procedures (McCain, 1988) (Liu & Steinkeler, 2013) (Kinard, Bouloux, Prahalad, Vogler, & Abramowicz, 2016). This technique can be divided into different therapeutic levels, which can vary from intra-articular lavage (level 1 intervention) to operative procedures of the joint structures (levels 2 and 3 interventions) (Ângelo, Araújo, & Sanz, 2021) (Murakami, 2021). TMJ arthroscopy has become more popular in the last years, because of its smaller incisions, safety, long term results, and faster recovery (McCain, Hossameldin, Srouji, & Maher, 2015).

Most studies related to TMJ arthroscopy are mainly focused on two outcomes: pain and mouth opening (Liu & Steinkeler, 2013) (González-García, 2015) (Laskin, 2018) (Al-Moraissi, Wolford, Ellis III, & Neff, 2020). Few studies evaluate TMD's symptoms other than pain (Locker & Slade, 1988) (Nourallah & Johansson, 1995) and its impact on the patient's quality of life (Rantala, et al., 2003) (Yule, et al., 2015) (Su, Liu, Yang, Shen, & Wang, 2016) (Trize, Calabria, Franzolin, Cunha, & Marta, 2018). From our knowledge, there is a lack of evidence regarding the postoperative patients' evolution, creating difficulties for clear postoperative orientations.

Before TMJ arthroscopy, the most common asked questions by the patients are: (1) how long it will take to restart normal diet; (2) how long it will take to eat without pain or discomfort; (3) how long it will take to restart "normal" lifestyle activities (professional and physical exercise). For surgeons, it is not easy to answer these questions because the recovery process varies between patients and there is a lack of scientific evidence regarding these topics.

In this ambit, the authors aimed to evaluate the recovery evolution of masticatory function and symptoms other than pain, throughout the first postoperative month after TMJ arthroscopy. The authors also considered that it would be important to evaluate the patients' satisfaction at the end of the follow-up period, because for many, what may appear to be a small improvement on a scale from 0 to 10, for them, could correspond to a great improvement on their quality of life.

The authors designed a prospective study following a rigorous protocol enrolling patients submitted to TMJ arthroscopy from November 1st of 2020 to April 30th of 2021.

Considering the academic purpose of this thesis, it is pertinent to start with a brief review on the temporomandibular joint, the masticatory function, temporomandibular disorders, and their classifications.

The Temporomandibular Joint

TMJ are among the most complex joints in the human body. It is a synovial joint between the glenoid fossa of the temporal bone and the mandibular condyle, whose articular surfaces are lined by fibrocartilage. These surfaces articulate through a biconcave interarticular meniscus – the articular disc. The TMJ is surrounded by a fibrous capsule, stabilized by three major ligaments (temporomandibular, sphenomandibular, and stylomandibular), and mainly mobilized by four muscles (masseter, temporalis, lateral pterygoid, and medial pterygoid). These structures act together with the teeth allowing a masticatory movement with the necessary force to break down food into smaller particles, which is also complemented by the ability to laterally move the mandible, creating a shear force that enhances its effectiveness and facilitates digestion (Standring, 2016).

The TMJ's mobility is dependent on the inseparable movement of both joints bilaterally, which work together to execute 1500 to 2000 movements daily and allow functions that are essential for survival and propagation, such as mastication, speech, deglutition, yawning, respiration (airway patency) and mating success (dentofacial esthetics and facial expressions) (Zhao & Monahan, 2007) (Bae & Park, 2013) (Ângelo D. F., 2018) (Roberts & Goodacre, 2020).

In the rest position, TMJ's condylar head is tilted in physiological anteversion, articulating with the mandible. Although the TMJ allows mandible movements in three dimensions, through both rotation and translation (Zhao & Monahan, 2007), it is structurally more adapted to accommodate elevation, depression, protrusion, and retraction movements, while lateralization of the whole jaw is less relevant (Standring, 2016) (Drake, Vogl, & Mitchell, 2009). The maximum range of mouth opening should vary between 40-60 mm, and critical functional mouth opening varies between 35-40 mm (Bae & Park, 2013). Maximal lateral and protrusive excursions should be superior to 5 mm (Zhao & Monahan, 2007).

MASTICATION

Mastication is a complex, dynamic and rhythmic process that depends on the coordinating movements of the mandible, tongue, lips, and cheeks to place the bolus between the teeth, for them to shear and crush (Tonni, et al., 2020). Humans select a particular bolus size for chewing, by selecting small pieces of food, which will be specific for each person and dependent on the foods' characteristics (Bhatka, Throckmorton, Wintergerst, Hutchins, & Buschang, 2004). The primary purpose of the stomatognathic system is the mechanical reduction of foods, into smaller elements, to ease and improve the efficiency of digestion (Zhao & Monahan, 2007).

According to Gray's Anatomy textbook (Standring, 2016), the mandible movement during a single mastication movement can be divided into the eccentric opening (continuing opening force after initial hinging and translation movements, aims to prepare the mandible for the following movements), the eccentric closing (bilateral contraction of the masticatory muscles, aims to generate strength for cutting and/or compression) and the power strokes (lateral slide movements of the mandible, aims to foods' breakdown).

The mandible movements in the mastication process can be described in three periods, based on their form, velocity, and acceleration. It starts with the preparatory period, having very short cycles, composed of two phases – opening (with a smaller amplitude than the succeeding series of cycles) and fast closing (with small lateral movements associated), where the incisors cut the ingested foods into portions. Then, there is the reduction period, where the cycles are composed of three phases – opening (in the first cycle it has the highest amplitude decreasing in the following cycles), fast closing (short) and slow closing (with wide lateral movements), and the premolars crush and breakdown the bolus into small portions. Finally, the preswallowing period, which is the longest sequence, is composed of five phases – opening 1 (from closure to postural position), opening 2 (pause in postural position), opening 3 (from postural position to maximum opening amplitude), fast closing and slow closing, where the molars grind the bolus into even smaller portions (Schwartz, Enomoto, Valiquette, & Lund, 1989) (van der Bilt, 2011) (Nascimento, 2017).

Many factors can influence the mastication process. Some physical characteristics of the foods, such as increased size, hardness, toughness, and elasticity, can increase the resistance to food breakdown and, consequently, provoke adaptations of the mastication, increasing the number of chewing stokes, the total mastication time, the duration of each cycle of mastication, the muscle activity and the mouth opening amplitude (Peyron, Lassauzay, & Woda, 2002) (Bhatka, Throckmorton, Wintergerst, Hutchins, & Buschang, 2004) (Woda, Foster, Mishellany, & Peyron, 2006) (van der Bilt, 2011) (Tonni, et al., 2020). The mastication process can also be influenced by an individual's characteristics, namely age, gender, dental state, facial skeletal deformities, and malfunctions of the stomatognathic system (TMJ, mandible, and masticatory muscles) or neural system. Although there are some differences regarding mouth opening amplitude and masticatory frequency between genders, this does not reflect in the total number of cycles constituting a masticatory sequence. Although aging provokes slight changes in some mastication parameters, this does not reflect on mastication impairment. Facial skeletal and dental deformities may compromise the correct occlusion, and malfunctions of the masticatory system or neural system may affect the masticatory performance (Peyron, Blanc, Lund, & Woda, 2004) (Woda, Foster, Mishellany, & Peyron, 2006) (Zhao & Monahan, 2007) (van der Bilt, 2011) (Trawitzki, Silva, Regalo, & Mello-Filho, 2011) (Peyron, Woda, Bourdiol, & Hennequin, 2017) (Tewksbury, Callaghan, Fulks, & Gerstner, 2018).

TEMPOROMANDIBULAR DISORDERS AND ITS CLASSIFICATION

Temporomandibular disorders are a group of clinical problems affecting the TMJ, myofascial muscles, and other related structures surrounding the joint. There is no unified standard for the classification of TMD because of the multiplicity of classifications present in the literature, which may hamper the ability to compare different studies (Zhang, et al., 2016).

Some of the classifications for TMD are presented below, such as the Wilkes Staging Classification for Internal Derangement of the TMJ (Wilkes, 1989), the Bronstein and Merrill Clinical Staging Classification for TMJ Internal Derangement (Bronstein & Merrill, 1992), the Research Diagnostic Criteria for Temporomandibular Disorders (Dworkin & LeResche, 1992), and the Dimitroulis Classification (Dimitroulis, 2013).

In 1989, Wilkes proposed a classification (**Table 1**), still widely used nowadays, for staging the internal derangements of the TMJ, based on clinical, radiologic, and anatomical (surgical) findings, into five stages of evolution (Wilkes, 1989) (De Rossi, Greenberg, Liu, & Steinkeler, 2014) (González-García, 2015) (Ângelo D. F., 2018).

Table 1 | Wilkes Staging Classification for Internal Derangement of the TMJ

Stage		Clinical presentation	Radiologic presentation	Surgical presentation
I	Early	▪ No pain ▪ Possible clicking (painless) ▪ No limitation of motion	▪ Slight anterior disc displacement ▪ Normal disc and bone contours	▪ Slight anterior disc displacement ▪ Normal disc and bone morphology
II	Early / Intermediate	▪ Few episodes of pain and tenderness (related to temporal headaches) ▪ Opening clicks (occasionally painful) ▪ Intermittent locking	▪ Slight anterior disc displacement ▪ Beginning of disc deformity (slight thickening of posterior disc contours) ▪ Normal bone contours	▪ Anterior disc displacement ▪ Early disc deformity (slight to mild thickening of the posterior disc edge) ▪ Normal bone morphology
III	Intermediate	▪ Multiple episodes of pain and tenderness (related to temporal headaches) ▪ Intermittent closed locking ▪ Restriction of motion	▪ Anterior disc displacement ▪ Significant disc deformity or disc prolapse ▪ Normal bone contours	▪ Anterior disc displacement ▪ Marked disc deformity ▪ Normal bone morphology
IV	Intermediate / Late	▪ Chronic pain (increased headaches) ▪ Variable restriction of motion	▪ Anterior disc displacement ▪ Increased disc deformity ▪ Mild to moderate osteosclerotic changes	▪ Marked disc deformity (with adhesions but no perforations) ▪ Osteoarthritis and osteophytes
V	Late	▪ Chronic or episodic pain ▪ Crepitus ▪ Chronic restriction of motion ▪ Constant function difficulties	▪ Anterior disc displacement ▪ Gross disc deformity (perforations) ▪ Gross bone changes (degenerative arthritic changes)	▪ Gross degenerative changes of disc and bone morphology (perforation, osteoarthritis, adhesions, flattening, osteophytes, and subcortical cysts)

Adapted from (Wilkes, 1989) (De Rossi, Greenberg, Liu, & Steinkeler, 2014) (González-García, 2015) (Ângelo D. F., 2018)

In 1992, Bronstein and Merrill proposed a modification to the Wilkes classification (**Table 2**), adding arthroscopic findings to the clinical, radiologic, and surgical findings (Bronstein & Merrill, 1992) (González-García, 2015).

Table 2 | Bronstein and Merrill Clinical Staging Classification for TMJ Internal Derangement (Arthroscopic findings added to Wilkes classification)

Stage		Roofing	Arthroscopic findings
I	Early	80 - 100 %	▪ Elongation of bilaminar zone ▪ Normal synovia and disk ▪ No cartilage involvement
II	Early / Intermediate	50 - 100 %	▪ Elongation of bilaminar zone ▪ Synovitis with adherences in the initial phase ▪ Anterolateral prolapse of the capsule
III	Intermediate	25 - 50 %	▪ Elongation of bilaminar zone ▪ Important synovitis with a decrease of lateral recess and adherences ▪ Chondromalacia I–II
IV	Intermediate / Late	0 - 25 %	▪ Hyalinization of the posterior ligament ▪ Synovitis with adherences ▪ Chondromalacia III–IV
V	Late	0 %	▪ Retrodiscal hyalinization and disk perforation ▪ Advanced synovitis with gross adhesions ▪ Fibrillation of articular surfaces ▪ Chondromalacia IV

Adapted from (Bronstein & Merrill, 1992) (González-García, 2015)

In 1992, Dworkin and LeResche proposed a more detailed diagnostic classification, known as the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD), based on a biopsychosocial model of pain, being divided into Axis I, for physical assessment (**Table 3**), and Axis II, for the assessment of psychosocial status. It has been widely employed as a diagnostic tool for TMD research (Dworkin & LeResche, 1992) (Schiffman, et al., 2014) (De Rossi, Greenberg, Liu, & Steinkeler, 2014) (Ângelo D. F., 2018).

Table 3 | Axis I of RDC/TMD

Group		Diagnosis	Criteria
I	Ia	Myofascial Pain	1. Ongoing pain on face, mandible, temple, preauricular, and ear. 2. Pain during palpation of, at least, 3 of 20 sites (posterior temporalis, middle temporalis, anterior temporalis, superior masseter, middle masseter, inferior masseter, retromandibular region, and submandibular region), considering that opposite sides count as a different site. 3. Pain-free mouth opening of, at least 40 mm **OR** Passive (forced) stretch inferior to 5 mm, **IF** pain-free mouth opening is inferior to 40 mm.
	Ib	Myofascial Pain with limited opening	1. Ongoing pain on face, mandible, temple, preauricular and ear. 2. Pain during palpation of, at least, 3 of 20 sites (posterior temporalis, middle temporalis, anterior temporalis, superior masseter, middle masseter, inferior masseter, retromandibular region, and submandibular region), considering that opposite sides count as a different site. 3. Pain-free mouth opening inferior to 40 mm **AND** Passive (forced) stretch of, at least 5 mm.
II	IIa	Disc Displacement with reduction	1. Joint clicks during excursion (to either side) or protrusion. **OR** 1. Joint clicks on both opening and closing. 2. Difference between the measurement of opening click and closing click is, at least, 5 mm. 3. Joint clicks extinguish during protrusive opening.
	IIb	Disc Displacement without reduction with limited mouth opening	1. No clicks during excursion (to either side) or protrusion. However, may click during opening or closing. 2. History of significant mouth opening limitation. 3. Maximum unassisted opening of, at most, 35 mm **AND** Passive (forced) stretch of, at most, 4 mm. 4. Maximum excursion to opposite side inferior to 7 mm **OR** Lateral deviation to the respective side.
	IIc	Disc Displacement without reduction without limited mouth opening	1. No clicks during excursion (to either side) or protrusion **AND** Joint clicks during opening or closing. 2. History of significant mouth opening limitation. 3. Maximum unassisted opening superior to 35 mm **AND** Passive (forced) stretch superior to 4 mm. 4. Maximum excursion to the opposite side of, at least, 7 mm.
III	IIIa	Arthralgia	1. Ongoing pain **OR** Pain during opening **OR** Pain during excursion. 2. Pain during palpation of the joint. 3. No coarse crepitus during any movement.
	IIIb	Osteoarthritis	1. Ongoing pain **OR** Pain during opening **OR** Pain during excursion. 2. Pain during palpation of the joint. 3. Coarse crepitus during any movement.
	IIIc	Osteoarthrosis	1. No ongoing pain **NOR** Pain during opening **NOR** Pain during excursion 2. No pain during palpation of the joint. 3. Coarse crepitus during any movement.

Adapted from (Schiffman, et al., 2014) (Ângelo D. F., 2018)

Although RDC/TMD has a major role in the investigation area, it complex, time-consuming, and, therefore, not practical to apply during everyday clinical practice. Additionally, it was mainly designed for non-surgical patients.

In this ambit, in 2013, Dimitroulis proposed a new classification that builds on the strengths of the previous, creating a simple, clear, focused, and updated classification aimed to specify the role of TMJ surgery in all TMD and more practical for the everyday practice of surgeons (**Table 5**). The Dimitroulis Classification is used to define the most beneficial therapeutic approach, staging TMD into 5 categories, based on clinical and radiologic findings, and its etiopathogenesis (Dimitroulis, 2013) (Ângelo D. F., 2018).

Table 4 | Dimitroulis Classification for TMD

Category		Clinical findings	Radiologic findings	Etiopathogenesis	Therapeutic approach
1	Normal TMJ	▪ TMJ acute pain ▪ No joint clicking ▪ No history of locking or dislocation ▪ No restriction of motion ▪ Normal chewing	▪ No morphological abnormalities	▪ Joint contusion /trauma ▪ Myofascial pain ▪ Otalgia ▪ Neuropathic pain ▪ Psychogenic pain	▪ Conservative treatment ▪ No indication for surgical intervention
2	Minor TMJ changes	▪ TMJ intermittent pain ▪ Joint clicking ▪ Occasional locking	▪ Normal disc and bone contours ▪ MRI: mild disc displacement (with reduction /effusion)	▪ Early TMJ internal derangement ▪ Joint inflammation /adhesions	▪ Conservative treatment is preferred ▪ TMJ arthrocentesis ▪ TMJ arthroscopy (level 1)
3	Moderate TMJ changes	▪ Painful chronic closed lock ▪ Recurrent joint swelling ▪ Painful recurrent dislocation ▪ Moderate pain during chewing	▪ Normal bone contours ▪ MRI: non-reducing disc displacement, mild disc deformity, and prominent eminence	▪ Moderate TMJ internal derangement ▪ Recurrent TMJ dislocation ▪ TMJ synovial chondromatosis ▪ Dislocated condylar fracture	▪ TMJ arthroscopy (level 2-3) ▪ TMJ arthroplasty (disc plication /repositioning ±eminectomy) ▪ Modified condylotomy ▪ ORIF of fractured condyle
4	Severe TMJ changes	▪ TMJ constant pain ▪ Painful crepitus ▪ Mildly limited mouth opening ▪ Severe pain during chewing and yawning	▪ MRI: severely degenerated disc (displaced and deformed) ▪ CT scans: mild to moderate condylar degeneration (flattening, osteophytes, small subchondral cysts)	▪ Advanced TMJ internal derangement ▪ Rare TMJ disorders (metabolic, inflammatory, or development diseases)	▪ TMJ discectomy ± condyloplasty /shave ▪ Debridement of glenoid fossa ▪ Reduction of eminence
5	Catastrophic TMJ changes	▪ Intolerable pain ▪ Constant crepitus ▪ Locking ▪ Malocclusion ▪ Incapacitating pain during chewing	▪ MRI: severely degenerated discs (irregular and deformed) ▪ CT scans: severe condylar degeneration (irregular articular surface, large subchondral cysts)	▪ TMJ osteoarthritis ▪ TMJ condylysis ▪ TMJ ankylosis ▪ TMJ tumor ▪ Iatrogenesis (TMJ degenerative changes from multiple surgeries)	▪ TMJ resection (condylectomy or discectomy) ▪ TMJ total joint replacement

Adapted from (Dimitroulis, 2013) (Ângelo D. F., 2018)

OBJECTIVES

In this prospective study, the authors aimed to study the first-month postoperative recovery of patients submitted to TMJ arthroscopy.

The primary outcome was to evaluate the evolution of (1) TMJ Pain during Essential Functions (at rest, during deep breaths, speech, mastication, and deglutition) during this period.

The secondary outcomes were the evolution of: (2) TMJ Fatigue/Discomfort during Essential Activities (mastication, mouth opening, and sleep); (3) Discomfort for the Mastication of Foods (towards different foods with different grades of hardness and calibers); (4) Discomfort to Resume Normal Lifestyle (professional activity and moderate to high intensity physical activities); and (5) Number of Analgesics Needed. To evaluate how much this improvement would represent to the patients, on the last day of evaluation, the authors evaluated (6) Participants' Satisfaction towards symptoms relief, masticatory function, and surgical expectations.

MATERIAL AND METHODS

STUDY DESIGN

This prospective study was conducted at *Instituto Português da Face*, in Lisbon, Portugal, from November 1st of 2020 to April 30th of 2021. The study protocol was approved by the ethics committee of *Instituto Português da Face* and by the ethics committee of *Centro Académico de Medicina de Lisboa* (**Appendix 1**).

All the enrolled participants were aware of its implications and gave their informed, clarified and free term of consent in writing and accordance with current legislation.

Study inclusion criteria were participants with, at least, 16 years of age, having an articular TMD with criteria for TMJ arthroscopy surgery (categories 2-4 of Dimitroulis Classification), and being submitted to level 2 TMJ arthroscopy.

As exclusion criteria were considered: previous TMJ intervention, pregnant women, children under 16 years old, patients with psychiatric diseases or impaired cognitive capacity (where comprehension might be compromised).

DATA COLLECTION

A database was created to register the multiple variants and observations that could influence those variants during the follow-up (such as the emergence of infection by SARS-CoV-2 during the follow-up).

Participants were contacted and interviewed through phone calls, due to the pandemic panorama regarding the SARS-CoV-2 outbreak.

In the first interview (2 to 5-days before surgical intervention), participants were asked their age and profession, and asked to characterize the following symptoms' impact on their quality of life (on a scale from 0 to 10), considering the previous month:

1. TMJ pain at rest.
2. TMJ pain during deep breaths.
3. TMJ pain during speech.
4. TMJ pain during mastication.
5. TMJ pain during deglutition.
6. Fatigue during mastication.
7. Discomfort during mouth opening.
8. Discomfort during sleep.
9. Discomfort for the mastication of a boiled potato (very low grade of hardness).
10. Discomfort for the mastication of a loaf bread slice (low grade of hardness).
11. Discomfort for the mastication of a brioche bread (high caliber).
12. Discomfort for the mastication of a "Maria" cookie (moderate grade of hardness).
13. Discomfort for the mastication of an uncooked and unpeeled almond (high grade of hardness).
    - 0 refers to no pain/fatigue/discomfort.
    - 1-3 refers to mild pain/fatigue/discomfort.
    - 4-6 refers to moderate pain/fatigue/discomfort.
    - 7-9 refers to severe pain/fatigue/discomfort.
    - 10 refers to incapacitating pain/fatigue/discomfort.

Afterward, there were made 8 more interviews with 3-day intervals (at postoperative D3, D6, D9, D12, D15, D18, D21, and D24), where participants were asked, in each interview, to characterize the following outcomes, considering the previous three days:

- Symptoms' impact on their quality of life (on a scale from 0 to 10):
    1. TMJ pain at rest.
    2. TMJ pain during deep breaths.
    3. TMJ pain during speech.
    4. TMJ pain during mastication.
    5. TMJ pain during deglutition.
    6. Fatigue during mastication.
    7. Discomfort during mouth opening.
    8. Discomfort during sleep.
    9. Discomfort for the mastication of a boiled potato (very low grade of hardness).
    10. Discomfort for the mastication of a loaf bread slice (low grade of hardness).
    11. Discomfort for the mastication of a brioche bread (high caliber).
    12. Discomfort for the mastication of a "Maria" cookie (moderate grade of hardness).
    13. Discomfort for the mastication of an uncooked and unpeeled almond (high grade of hardness).
    14. Discomfort to restart professional activity.
    15. Discomfort to restart moderate to high intensity physical activities.
        - 0 refers to no pain/fatigue/discomfort.
        - 1-3 refers to mild pain/fatigue/discomfort.
        - 4-6 refers to moderate pain/fatigue/discomfort.
        - 7-9 refers to severe pain/fatigue/discomfort.
        - 10 refers to incapacitating pain/fatigue/discomfort.
- Number of analgesic pills taken, on average (considering the previous 3 days), by day.

In the last interview (at postoperative D30), participants were asked to characterize the following outcomes, considering the previous six days:

- Symptoms' impact on their quality of life (on a scale from 0 to 10):
    1. TMJ pain at rest.
    2. TMJ pain during deep breaths.
    3. TMJ pain during speech.
    4. TMJ pain during mastication.
    5. TMJ pain during deglutition.
    6. Fatigue during mastication.
    7. Discomfort during mouth opening.
    8. Discomfort during sleep.
    9. Discomfort for the mastication of a boiled potato (very low grade of hardness).
    10. Discomfort for the mastication of a loaf bread slice (low grade of hardness).
    11. Discomfort for the mastication of a brioche bread (high caliber).
    12. Discomfort for the mastication of a "Maria" cookie (moderate grade of hardness).
    13. Discomfort for the mastication of an uncooked and unpeeled almond (high grade of hardness).
    14. Discomfort to restart professional activity.
    15. Discomfort to restart moderate to high intensity physical activities.
        - 0 refers to no pain/fatigue/discomfort.
        - 1-3 refers to mild pain/fatigue/discomfort.
        - 4-6 refers to moderate pain/fatigue/discomfort.
        - 7-9 refers to severe pain/fatigue/discomfort.
        - 10 refers to incapacitating pain/fatigue/discomfort.
- Number of analgesic pills taken, on average, by day.

Finally, they were also asked to characterize their satisfaction (on a scale from 0 to 10), towards symptoms relief, masticatory function, and preoperative expectations:

- 0 refers to no satisfaction at all.
- 1-3 refers to low satisfaction.
- 4-6 refers to moderate satisfaction.
- 7-9 refers to high satisfaction.
- 10 refers to total satisfaction.

Study Protocol

Before surgery, participants were handed two protocols by the attending surgeon (David Faustino Ângelo, MD, Ph.D.): one provided instructions regarding the medication (for the first 5 postoperative days) and other general recommendations (**Appendix 2**), and the other provided instructions regarding how the studied foods should be prepared, for the standardization of these variables as much as possible (**Appendix 3**).

The first interview was chosen as the moment for the medical student (André Prior) to introduce himself before the surgery, reinforcing the study instructions to guarantee they were correctly understood and fulfilled, to explain each variable being asked to qualify and quantify by the participant, and to clarify all questions that might remain. For example, it was explained that “discomfort” implied not only “joint pain” but also other symptoms that would cause any kind of discomfort, such as joint clicking, joint instability, local tenderness, and jaw locking; specifically in terms of discomfort for mastication of certain aliments, because it is not advised to force TMJ into masticating hard aliments in an early stage of the recovery (Wilk, Stenback, & McCain, 1993). Study participants should refer 10/10 pain or discomfort when they expected that chewing certain foods would cause damage (even without attempting it). Although it was mentioned in the protocol provided, relative to food preparation, participants were reminded that they should not divide the food into smaller portions to facilitate its introduction through the mouth, neither let the food humidify inside the oral cavity to facilitate its mastication.

In the following interviews, it was confirmed that the participants were following the instructions given and that they were attending all follow-up appointments, physical therapy sessions, and speech therapy sessions, which were essential for the best recovery possible.

STATISTICAL ANALYSIS

The variables were expressed as the mean (± standard deviation (SD)). The normality analysis was performed with Shapiro-Wilk test in each time (Preoperative-D30) and in each analysis. For longitudinal analysis, a one-way ANOVA with repeated measures was performed, when the assumptions were fulfilled. Estimates of effect size were calculated using partial eta squared (η2p). Observed power was calculated with 1-β's score. When it was not possible to apply a parametric test, the Friedman test was performed. Kendall's W was used as the coefficient of concordance of Friedman test. $P < 0.05$ was considered statistically significant. These data analyses were performed using SPSS (v26) and Graphpad Prism (v9).

Assuming "impact" as the grade of pain/discomfort/fatigue attributed by each participant, calculated, for each variable, the Global Impact (**GI**) of the symptom in the study sample, expressed as "**GI** points, in a total of 90 points":

$$\boldsymbol{GI} = impact\ \#1 + impact\ \#2 + (\dots) + impact\ \#8 + impact\ \#9$$

Using this variable, three measures were calculated: Relative Global Impact (RGI), Global Impact Absolute Reduction (GIAR), and Global Impact Relative Reduction (GIRR).

The Relative Global Impact (RGI), based on the "Relative Risk" measure (White, 2020), represents the ratio between the symptom's impact at the postoperative D30 evaluation and its impact at the preoperative evaluation, expressed as a percentage:

$$\boldsymbol{RGI} = \left(\frac{\frac{postoperative\ D30\ \boldsymbol{GI}}{90}}{\frac{preoperative\ \boldsymbol{GI}}{90}} \right) * 100$$

The Global Impact Absolute Reduction (GIAR), based on the "Absolute Risk Reduction" measure (White, 2020), represents the decrease of the symptom's impact from the preoperative evaluation to the postoperative D30 evaluation, expressed as a percentage:

$$\boldsymbol{GIAR} = \left| \frac{preoperative\ \boldsymbol{GI}}{90} - \frac{postoperative\ D30\ \boldsymbol{GI}}{90} \right| * 100$$

The Global Impact Relative Reduction (GIAR), based on the “Relative Risk Reduction” measure (White, 2020), represents the ratio between the decrease of the symptom’s impact from the preoperative evaluation to the postoperative D30 evaluation, and its impact at the preoperative evaluation, expressed as a percentage:

$$\boldsymbol{GIRR} = \left(\frac{\left| \frac{preoperative\ \boldsymbol{GI}}{90} - \frac{postoperative\ D30\ \boldsymbol{GI}}{90} \right|}{\frac{preoperative\ \boldsymbol{GI}}{90}} \right) * 100$$

The GI variable and these 3 measures (RGI, GIAR and GIRR) were only applied to the outcomes that were evaluated at preoperative and postoperative D30.

RESULTS

Table 5 | Participants' characteristics

Participant (#)	Age	Profession	General intervention	Specific intervention
1	39	Administrative	Bilateral Arthroscopy	Level 2
2	54	Security	Bilateral Arthroscopy	Level 2
3	16	Student	Unilateral Arthroscopy	Level 2
4	23	Student	Bilateral Arthroscopy	Level 2
5	31	Music Teacher	Bilateral Arthroscopy	Level 2
6	36	Business	Bilateral Arthroscopy	Level 2
7	43	Beauty Artist	Unilateral Arthroscopy	Level 2
8	25	Administrative	Bilateral Arthroscopy	Level 2
9	18	Student	Bilateral Arthroscopy	Level 2
Mean (± SD)	31.67 (± 12.51)			

SD = Standard-deviation

A total of 9 participants were enrolled in this study, being all 9 women (100%), and their mean age was 31.67 ± 12.51 years old (range 16-54 years old). Participants' characteristics are summarized on **Table 5**. All 9 procedures were classified as level 2 TMJ arthroscopies: 7 of the participants underwent bilateral arthroscopy, while 2 of them underwent unilateral arthroscopy. All 9 participants were followed up for 32-35 days.

The various outcomes were clustered into 6 groups for analysis: (1) TMJ Pain during Essential Functions (rest, deep breaths, speech, mastication, and deglutition); (2) TMJ Fatigue/Discomfort during Essential Activities (mastication, mouth opening and sleep); (3) Discomfort for the Mastication of Foods (boiled potato, loaf bread slice, brioche bread, "Maria" cookie", and uncooked and unpeeled almond); (4) Discomfort to Resume to Normal Lifestyle (professional activity and moderate to high intensity physical activities); (5) Number of Analgesics Needed; and (6) Participant's Satisfaction (towards symptoms relief, masticatory function, and preoperative expectations).

(1) TMJ PAIN DURING ESSENTIAL FUNCTIONS

Table 6 | Descriptive Statistics – TMJ Pain during Essential Functions

	TMJ pain at rest (Mean ± SD)	TMJ pain during deep breaths (Mean ± SD)	TMJ pain during speech (Mean ± SD)	TMJ pain during mastication (Mean ± SD)	TMJ pain during deglutition (Mean ± SD)
Preoperative	4.00 ± 3.20	0.00 ± 0.00	3.22 ± 3.11	5.22 ± 2.99	0.00 ± 0.00
D3	2.10 ± 2.20	0.00 ± 0.00	2.33 ± 2.29	4.11 ± 2.57	0.00 ± 0.00
D6	2.30 ± 2.50	0.00 ± 0.00	2.22 ± 2.64	3.78 ± 2.77	0.00 ± 0.00
D9	0.78± 1.20	0.00 ± 0.00	0.50 ± 0.76	2.00 ± 1.94	0.00 ± 0.00
D12	0.13 ± 0.35	0.00 ± 0.00	0.13 ± 0.35	1.33 ± 1.32	0.00 ± 0.00
D15	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	1.00 ± 1.41	0.00 ± 0.00
D18	0.13 ± 0.35	0.00 ± 0.00	0.00 ± 0.00	1.00 ± 1.32	0.00 ± 0.00
D21	0.25 ± 0.46	0.00 ± 0.00	0.13 ± 0.35	1.22 ± 1.99	0.00 ± 0.00
D24	0.63 ± 1.40	0.00 ± 0.00	1.56 ± 2.46	0.63 ± 1.19	0.00 ± 0.00
D30	0.67 ± 1.10	0.00 ± 0.00	0.56 ± 0.88	0.38 ± 0.74	0.00 ± 0.00
$X^2(9)$	29.85		25.85	39.82	
p	<0.001		0.002	<0.001	
Kendall's W	0.414		0.479	0.553	

D = Postoperative days; SD = standard-deviation; Friedman ($X^2(9)$) test of between subjects effects; scale 0-10.

The Friedman's non-parametric test ($X^2(9)$) was performed, taking as within-subject effects between preoperative and postoperative (D3 to D30) for TMJ Pain during Essential Functions (**Table 6**). Significant effects across time were found for TMJ pain at rest, during speech and during mastication – $X^2(9)$ = 29.85, 25.85 and 39.82, $p < 0.001$, = 0.002 and < 0.001, Kendall's W = 0.414, 0.479 and 0.553, respectively. Because all values were null regarding TMJ pain during deep breaths and deglutition, this analysis did not apply to these outcomes. **Figure 1** represents TMJ Pain mean (± SD) impact during Essential Functions from preoperative to postoperative D30.

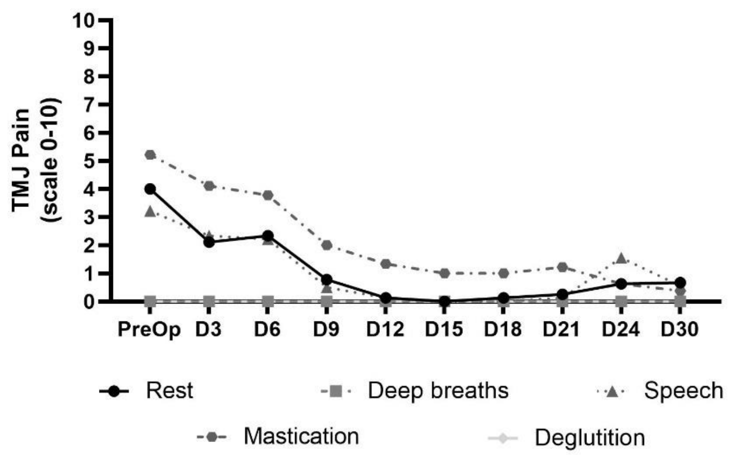


Figure 1 | Statistical results of TMJ Pain during Essential Functions.

PreOp = preoperative, D = postoperative days

Table 7 | Global Impact – TMJ Pain during Essential Functions

	TMJ pain at rest (GI (%))	TMJ pain during deep breaths (GI (%))	TMJ pain during speech (GI (%))	TMJ pain during mastication (GI (%))	TMJ pain during deglutition (GI (%))
Preoperative GI	36 (40.00%)	0 (0.00%)	29 (32.22%)	47 (52.22%)	0 (0.00%)
D30 GI	6 (6.67%)	0 (0.00%)	5 (5.56%)	13 (14.44%)	0 (0.00%)
RGI	16.67%	-	17.24%	27.66%	-
GIAR	33.33%	-	26.67%	37.78%	-
GIRR	83.33%	-	82.76%	72.34%	-

GI = Global impact; GIR = Global Impact Reduction; RGI = Relative Global Impact.

In this study sample and regarding TMJ pain at rest, during speech and deglutition, the authors observed a Relative Global Impact (RGI), of each symptom on postoperative D30 compared to its preoperative evaluation, of 16.67%, 17.24% and 27.66%, respectively, and a Global Impact Absolute Reduction (GIAR), from the preoperative evaluation to the postoperative D30, of 33.33%, 26.67% and 37.78%, respectively, which corresponded to a Global Impact Relative Reduction (GIRR) of 83.33%, 82.76% and 72.34%, respectively (**Table 7**). **Figure 2** represents TMJ Pain Global Impact during Essential Functions at preoperative and postoperative D30 evaluations and its GIAR.

Because the Global Impact (GI) at preoperative and postoperative D30 evaluations were null for TMJ pain during deep breaths and during deglutition, the calculation of the aforementioned measures for these symptoms was irrelevant.

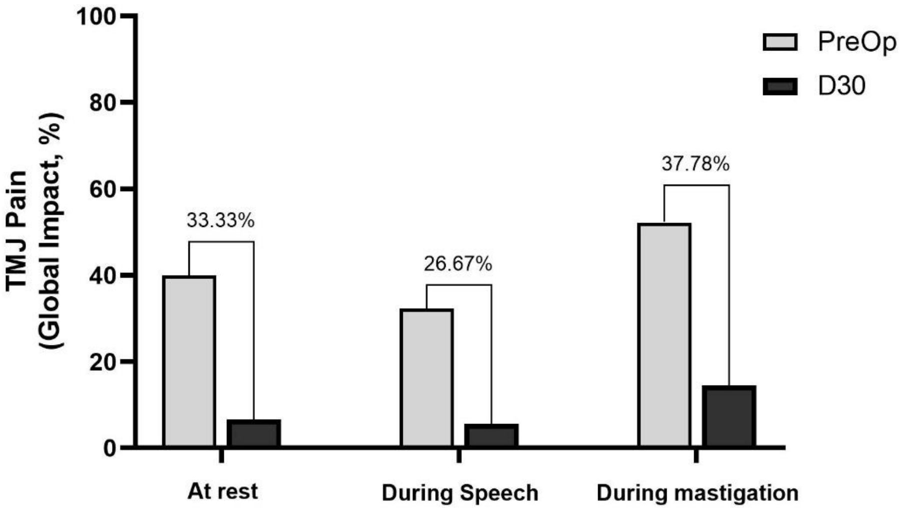


Figure 2 | TMJ Pain Global Impact during Essential Functions.

PreOp = preoperative day, D30 = postoperative day 30

(2) TMJ Fatigue / Discomfort during Essential Activities

Table 8 | Descriptive Statistics – TMJ Fatigue / Discomfort during Essential Activities

	Fatigue during mastication (Mean ± SD)	Discomfort during mouth opening (Mean ± SD)	Discomfort during sleep (Mean ± SD)
Preoperative	5.78 ± 3.11	5.89 ± 3,06	5.89 ± 3.89
D3	5.33 ± 3.32	5.11 ± 2.85	5.33 ± 3.77
D6	4.00 ± 3.00	3.89 ± 2.93	4.44 ± 3.94
D9	3.33 ± 2.55	3.67 ± 2.92	3.56 ± 3.61
D12	3.67 ± 2.06	3.67 ± 2.74	2.78 ± 3.23
D15	3.22 ± 2.64	3.22 ± 2.82	2.44 ± 3.13
D18	2.67 ± 2.45	3.11 ± 2.98	2.56 ± 3.00
D21	2.78 ± 2.68	3.22 ± 2.91	2.33 ± 3.12
D24	3.78 ± 2.59	3.78 ± 3.19	2.78 ± 3.67
D30	2.33 ± 1.73	3.56 ± 2.96	2.67 ± 3.67
F(9,72)	3.54	2.86	
$X^2(9)$			33.73
p	0.001	0.006	p<0.001
Kendall's W			0.416
η^2_p	0.31	0.26	
1-β	0.98	0.94	

D = Postoperative days; SD = standard-deviation; one-way ANOVA with repeated measures (F(9, 72)) and Friedman ($X^2(9)$): tests between subjects effects η^2_p = effect size; (1 - β) = observed power; scale 0-10.

A one-way ANOVA with repeated measures was performed, taking as within-subject effects between preoperative and postoperative (D3 to D30) for TMJ Fatigue/Discomfort during Essential Activities (**Table 8**). Significant effects across time were found for TMJ fatigue during mastication and discomfort during mouth opening– $F(9, 72) = 3.54$ and 2.86, *p* = 0.001 and 0.006, η^2p = 0.31 and 0.26, (1-β) = 0.98 and 0.94, respectively. The Friedman's non-parametric test ($X^2(9)$) was performed, taking as within-subject effects between preoperative and postoperative (D3 to D30). Significant effects across time were found for TMJ discomfort during sleep–$X^2(9) = 33.73$, p < 0.001, Kendall's W = 0.416. **Figure 3** represents TMJ Fatigue/Discomfort mean (± SD) impact during Essential Activities from preoperative to postoperative D30.

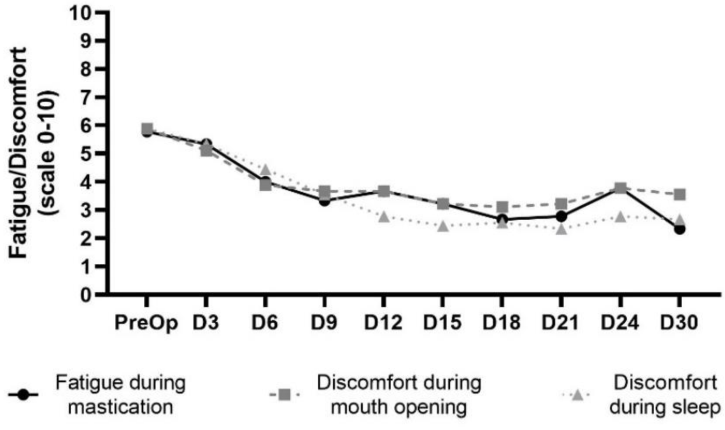


Figure 3 | Statistical results of the TMJ Fatigue / Discomfort during Essential Activities. PreOp = preoperative day, D = postoperative days

Table 9 | Global Impact – TMJ Fatigue/Discomfort during Essential Activities

	Fatigue during mastication (GI (%))	Discomfort during mouth opening (GI (%))	Discomfort during sleep (GI (%))
Preoperative GI	52 (57,78%)	53 (58.89%)	53 (58.89%)
D30 GI	21 (23.33%)	32 (35.56%)	24 (26.67%)
RGI	40.38%	60.38%	45.28%
GIAR	34.44%	23.33%	32.22%
GIRR	59.62%	39.62%	54.72%

GI = Global impact; GIR = Global Impact Reduction; RGI = Relative Global Impact.

In this study sample and regarding fatigue during mastication, discomfort during mouth opening, and discomfort during sleep, the authors observed a RGI (of each symptom on postoperative D30 compared to its preoperative evaluation) of 40.38%, 60.38% and 45.28%, respectively, and a GIAR (from the preoperative evaluation to the postoperative D30) of 34.44%, 23.33% and 32.22%, respectively, which corresponded to a GIRR of 59.62%, 39.62% and 54.72%, respectively (**Table 9**). **Figure 4** represents TMJ Fatigue/Discomfort Global Impact during Essential Activities at preoperative and postoperative D30 evaluations and its GIAR.

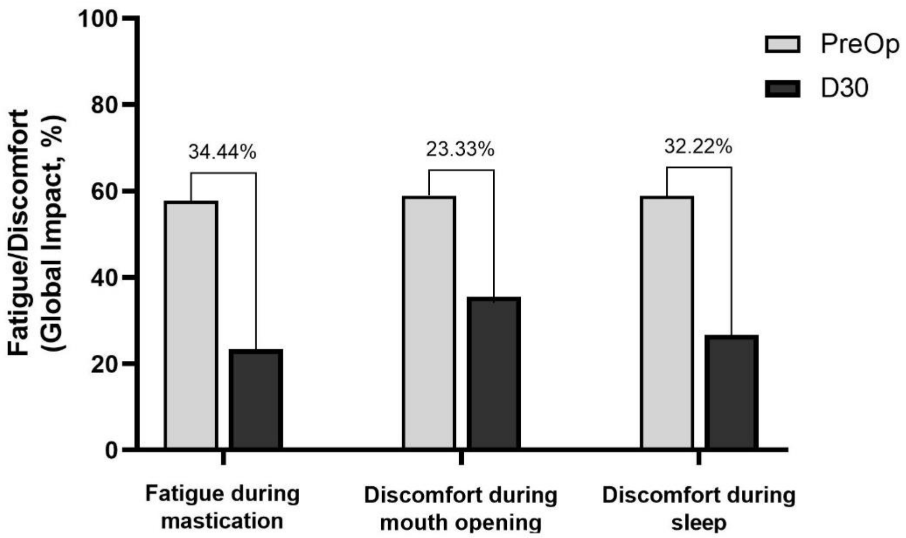


Figure 5 | TMJ Fatigue / Discomfort Global Impact during Essential Activities.

PreOp = preoperative day, D30 = postoperative day 30

(3) Discomfort for the Mastication of Foods

Table 10 | Descriptive Statistics – Discomfort for the Mastication of Foods

	Discomfort for the mastication of a boiled potato (Mean ± SD)	Discomfort for the mastication of a loaf bread slice (Mean ± SD)	Discomfort for the mastication of a brioche bread (Mean ± SD)	Discomfort for the mastication of a "Maria" cookie (Mean ± SD)	Discomfort for the mastication of an uncooked and unpeeled almond (Mean ± SD)
Preoperative	2.33 ± 1.58	3.22 ± 2.39	4.78 ± 2.53	4.22 ± 2.95	7.78 ± 2.44
D3	5.22 ± 4.49	6.56 ± 4.28	7.11 ± 3.52	7.44 ± 3.84	10.00 ± 0.00
D6	1.00 ± 1.51	2.44 ± 2.96	4.11 ± 3.10	5.89 ± 3.92	10.00 ± 0.00
D9	0.67 ± 1.12	1.11 ± 1.36	2.78 ± 2.17	2.25 ± 1.75	10.00 ± 0.00
D12	0.44 ± 0.88	0.67 ± 1.12	2.11 ± 1.69	1.25 ± 1.83	7.00 ± 3.74
D15	0.00 ± 0.00	0.22 ± 0.44	1.44 ± 1.74	1.33 ± 1.94	4.56 ± 4.07
D18	0.00 ± 0.00	0.13 ± 0.35	1.56 ± 1.94	1.56 ± 1.81	4.33 ± 3.71
D21	0.00 ± 0.00	0.00 ± 0.00	1.11 ± 1.83	1.33 ± 1.73	3.78 ± 4.02
D24	0.00 ± 0.00	0.00 ± 0.00	0.88 ± 1.25	1.00 ± 1.41	3.67 ± 4.18
D30	0.00 ± 0.00	0.00 ± 0.00	0.75 ± 1.17	0.50 ± 1.07	3.22 ± 4.35
$X^2(9)$	32.72	41.54	38.26	39.02	42.08
p	<0.001	<0.001	<0.001	<0.001	<0.001
Kendall's W	0.52	0.58	0.53	0.62	0.58

D = Postoperative days; SD = standard-deviation; Friedman ($X^2(9)$) test of between subjects effects; scale 0-10.

The Friedman's non-parametric test ($X^2(9)$) was performed, taking as within-subject effects between preoperative and postoperative (D3 to D30) for Discomfort for the Mastication of Foods (**Table 10**). Significant effects across time were found for all foods, namely boiled potato, loaf bread slice, brioche bread, "Maria" cookie and uncooked and unpeeled almond– $X^2(9)$ = 32.72, 41.54, 38.26, 39.02 and 42.08, $p < 0.001$, Kendall's W = 0.52, 0.58, 0.53, 0.62 and 0.58, respectively. **Figure 5** represents Discomfort mean (± SD) impact for the Mastication of Foods from preoperative to postoperative D30.

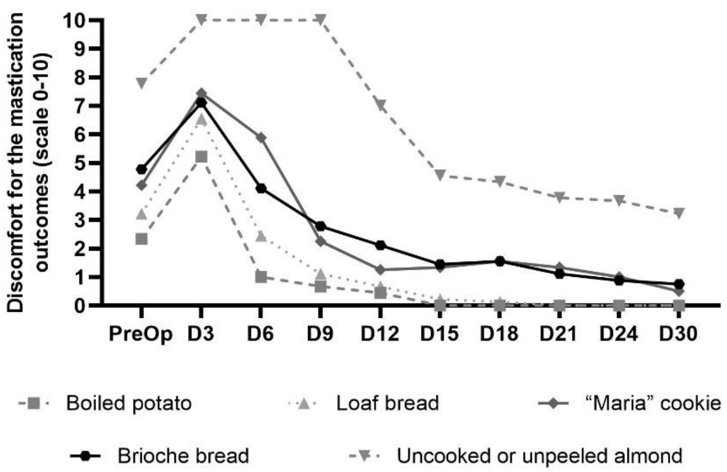


Figure 5 | Statistical results of the Discomfort for the Mastication of Foods.

PreOp = preoperative day, D = postoperative days

Table 11 | Global Impact – Discomfort for the Mastication of Foods

	Discomfort for the mastication of a boiled potato (GI (%))	Discomfort for the mastication of a loaf bread slice (GI (%))	Discomfort for the mastication of a brioche bread (GI (%))	Discomfort for the mastication of a "Maria" cookie (GI (%))	Discomfort for the mastication of an uncooked and unpeeled almond (GI (%))
Preoperative GI	21 (23.33%)	29 (32.22%)	43 (47.78%)	38 (42.22%)	70 (77.78%)
D30 GI	0 (0.00%)	4 (4.44%)	16 (17.78%)	14 (15.56%)	29 (32.22%)
RGI	0.00%	13.79%	37.21%	36.84%	41.43%
GIAR	23.33%	27.78%	30.00%	26.67%	45.56%
GIRR	100.00%	86.21%	62.79%	63.16%	58.57%

GI = Global impact; GIR = Global Impact Reduction; RGI = Relative Global Impact.

In this study sample and regarding Discomfort for the Mastication of various Foods, the authors observed a RGI of 0.00% for a boiled potato, 13.79% for a loaf bread slice, 37.21% for a brioche bread, 36.84% for a "Maria" cookie and 41.43% for an uncooked and unpeeled almond, at the end of the study when compared to the preoperative evaluation. They observed a GIAR of 23.33%, 27.78%, 30.00%, 26.67% and 45.56%, respectively, which corresponded to a GIRR of 100.00%, 86.21%, 62.79%, 63.16% and 58.57%, respectively (**Table 11**). **Figure 6** represents Discomfort Global Impact for the Mastication of Foods at preoperative and postoperative D30 evaluations and its GIAR.

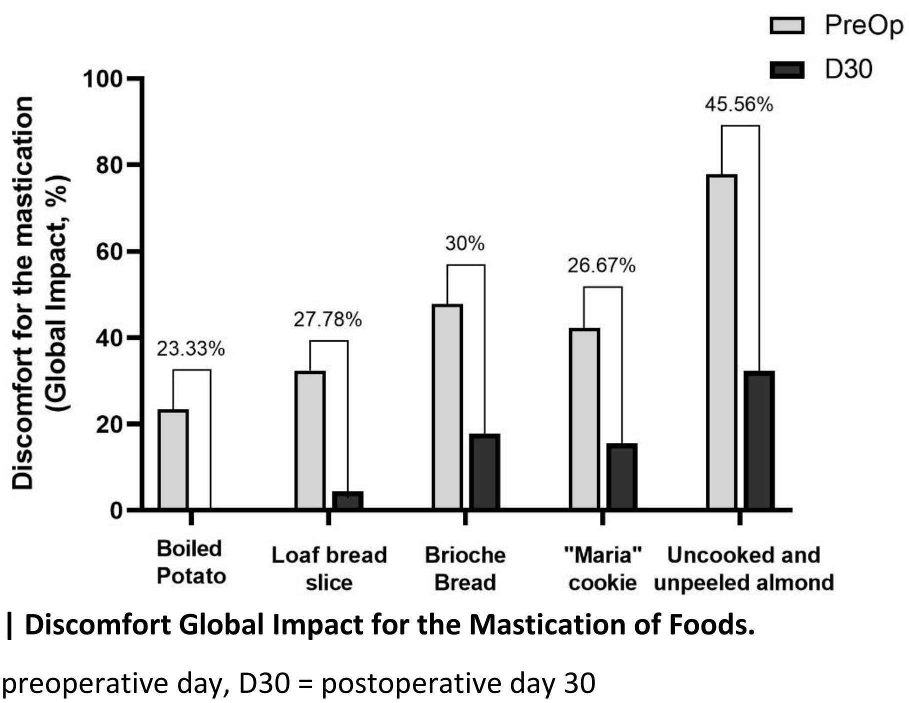


Figure 6 | Discomfort Global Impact for the Mastication of Foods.

PreOp = preoperative day, D30 = postoperative day 30

(4) Discomfort to Resume Normal Lifestyle

Table 12 | Descriptive Statistics – Discomfort to Resume Normal Lifestyle

	Discomfort to restart professional activity (Mean ± SD)	Discomfort to restart moderate to high intensity physical activities (Mean ± SD)
D3	6.78 ± 2.68	9.25 ± 1.49
D6	5.22 ± 3.31	7.44 ± 3.4
D9	3.11 ± 3.55	5.67 ± 3.2
D12	2.56 ± 2.40	4.11 ± 3.2
D15	0.75 ± 1.39	3.11 ± 3.86
D18	3.00 ± 3.77	2.89 ± 3.98
D21	2.89 ± 3.98	2.33 ± 4.10
D24	3.56 ± 4.48	2.22 ± 4.15
D30	2.11 ± 3.95	2.22 ± 4.15
$X^2(8)$	28.08	28.38
p	<0.001	<0.001
Kendall's W	0.44	0.44

D = Postoperative days; SD = standard-deviation; Friedman ($X^2(9)$) test of between subjects effects; scale 0-10.

The Friedman's non-parametric test ($X^2(8)$) was performed, taking as within-subject effects between D3 to D30 postoperative for Discomfort to Resume Normal Lifestyle (**Table 12**). Significant effects across time were found for restart of professional activity and moderate to high intensity physical activities– $X^2(8) = 28.08$ and 28.38, $p < 0.001$, Kendall's W = 0.44 and 0.44, respectively. **Figure 7** represents Discomfort mean (± SD) impact to Resume to Normal Lifestyle from postoperative D3 to D30.

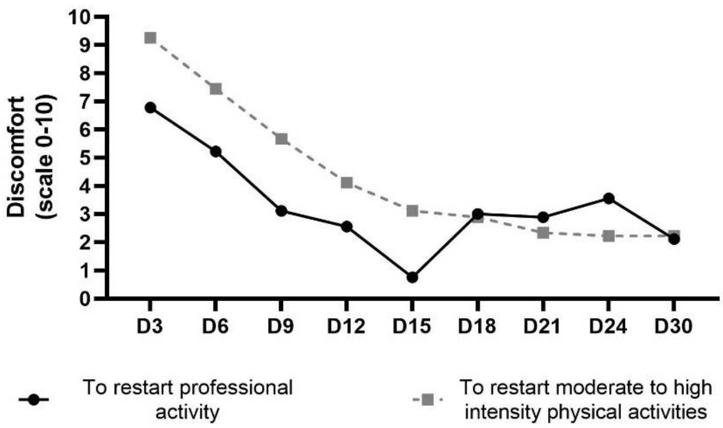


Figure 7 | Statistical results of the Discomfort to Resume Normal Lifestyle.

D = postoperative days

(5) NUMBER OF ANALGESICS NEEDED

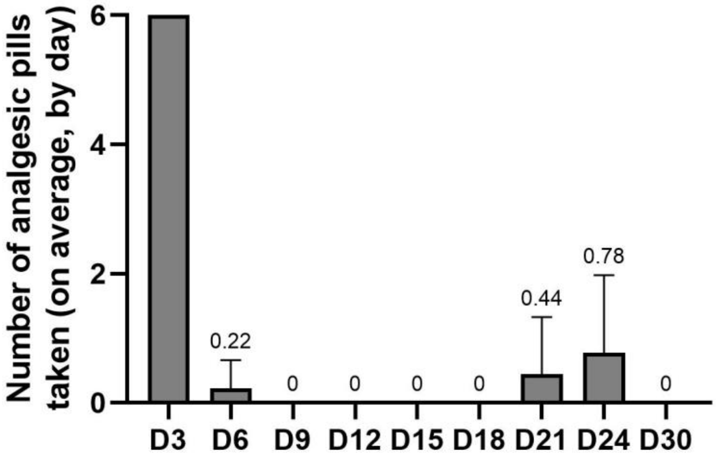
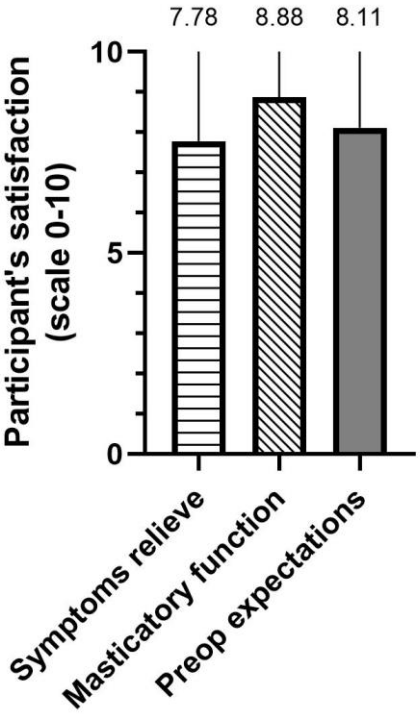


Figure 8 | Number of analgesic pills taken in the postoperative period, on average, by day (considering the previous three/six days). D = postoperative days

Regarding the Number of Analgesics Needed (**Figure 8**), at postoperative D3 all the participants were taking 6 analgesic pills, by day, which decreased to an average of 0.22 pills, by day, on postoperative D6. Through postoperative D9 to D18, none of the participants referred need to take analgesics, considering the previous three days. On D21, on average, it was observed a need of 0.44 pills per day, considering the previous three days, which increased to 0.78, at postoperative D24. At postoperative D30, none of the participants reported the need for analgesia on the previous six days.

(6) PARTICIPANTS' SATISFACTION



Regarding the Participants' Satisfaction at postoperative D30 (**Figure 9**), the authors differentiated three outcomes. At the end of the follow-up, it was observed a satisfaction of 7.78, on average, towards symptoms relief, 8.88 towards masticatory function, and 8.11 towards preoperative expectations.

Figure 9 | Participants' Satisfaction (towards symptoms relief, masticatory function, and preoperative expectations) on postoperative D30, on average. PreOp = preoperative

DISCUSSION

Most studies that evaluate the postoperative recovery after TMJ arthroscopy observed successful results, however, they mainly investigate two outcomes: pain and mouth opening (Liu & Steinkeler, 2013) (González-García, 2015) (Laskin, 2018) (Al-Moraissi, Wolford, Ellis III, & Neff, 2020). From our knowledge, few studies evaluate functional outcomes related to the mastication (Locker & Slade, 1988) (Nourallah & Johansson, 1995) or its impact on the patient's quality of life (Rantala, et al., 2003) (Yule, et al., 2015) (Su, Liu, Yang, Shen, & Wang, 2016) (Trize, Calabria, Franzolin, Cunha, & Marta, 2018).

Since there was a small study sample, the majority of the outcomes did not follow a normal distribution. However, two outcomes fulfilled the criteria to be analyzed through a one-way ANOVA test (fatigue during mastication and discomfort during mouth opening). The remaining outcomes were analyzed through a non-parametric test (Friedman's test) which, similarly, analyses and verifies if there is a statistically significant variance of the data over time.

Considering that previous studies report only the overall pain relief at 6-12 months after the surgical intervention to infer its overall success, the authors did not perform a comparison between those results and the ones found in this study. However, in this study, the authors observed for pain relief results in accordance with the evidence found by other authors (Liu & Steinkeler, 2013) (González-García, 2015) (Laskin, 2018), as it was observed a relative pain reduction of 72.34-83.33% at the end of the follow-up (postoperative D30), when compared to the preoperative evaluations.

The TMJ pain during essential functions started stabilizing at postoperative D9: on average, reports of TMJ pain became practically null at rest and during speech, and mild regarding mastication. In this study, TMJ pain during mastication only became, on average, practically null at D24.

Regarding fatigue and discomfort during essential activities, they presented a more gradual improvement over time of the symptoms' impact, when compared to the other clusters; the authors observed a very similar evolution of all three outcomes throughout the follow-up and, from D6-D9 forwards, the reports seem to have stabilized around the borderline that separates mild from moderate grades of fatigue/discomfort (2-4 out of 10).

The discomfort during mouth opening was the outcome that presented the lowest GIRR (39.62% vs 54.72-100.00%). Some evidence suggests that the maximum range of mouth opening at the end of the first postoperative month is still within abnormal values and that may take up to 12 months until it reaches "normal" mobility (Wilk, Stenback, & McCain, 1993) (Goudot, Jaquinet, Hugonnet, Haefliger, & Richter, 2000) (Zhao & Monahan, 2007) (Abboud, Nadel, Yarom, & Yahalom, 2016) (O'Connor, Fawthrop, Salha, & Sidebottom, 2017) (Davis, et al., 2020), which may explain why this outcome shows an inferior improvement when compared with the remaining.

Concerning discomfort for the mastication of different foods, as it was mentioned in the chapter **Material and Methods – Study Protocol**, participants should refer to 10/10 discomfort when they expected (even without attempting) that chewing certain foods would cause damage to the joint (Wilk, Stenback, & McCain, 1993). Consequently, because many participants were feeling joint tension, stiffness, and pain in the first 3 to 6 postoperative days, reports in postoperative D3 and D6 were, respectively, higher and equivalent to the preoperative reports, which was expected according to the evidence in the literature (Zhao & Monahan, 2007). Although these results do not allow to precise the timing when there is a significant statistical improvement, reports of discomfort were practically null for the mastication of a boiled potato, at D6, and for a slice of loaf bread, at D9; were mild for a "Maria" cookie and for a brioche bread, at D9; for an uncooked and unpeeled almond, reports stabilized at a moderate grade from D15 forwards.

If these results can be amplified in other studies that follow a similar protocol, the authors believe that they will be able to define a diet plan which patients would feel safe and comfortable to follow. Consequently, the exertion of an excessive force on the joint in the early phase of the recovery could become a less relevant risk factor for TMD relapse.

The authors believe that patients recovering from TMJ arthroscopy would feel comfortable and safe to introduce a soft diet (foods with a very low grade of hardness) around postoperative D6, foods with a low grade of hardness around D9, foods with a moderate grade of hardness around D12 and foods with a higher grade of hardness and/or with a higher caliber on D15.

Regarding the discomfort to return to the patients' normal lifestyle, the data related to the discomfort to restart professional activity looks conflicting. The authors attribute it to the fact that, in addition to two participants having relapsed, another was infected by SARS-CoV-2, which may be a source of "confusion" of the data. The authors believe most patients submitted to TMJ arthroscopy will feel comfortable to restart professional activity (which represent a major factor to the return to the patient's "normal" lifestyle) on D15. The authors also recommend the restart of moderate intensity physical activity after 3 weeks (D21).

In terms of the need for analgesics the authors observed that there was no need for extra analgesics (other than the ones prescribed in postoperative analgesia scheme) in the first days, totaling 6 analgesic pills, per day. In the remaining follow-up days, there was also little need for analgesic pills, averaging less than 1 *per* day.

Finally, at the end of this follow-up (only 30 days after TMJ arthroscopy), on average, the participants referred a high level of satisfaction towards the relief of their preoperative symptoms, the improvement of their masticatory function, and their preoperative expectations for the postoperative recovery. This reflects how this minimally invasive technique can achieve great results while having a lower impact on the patients' recovery.

Limitations

Due to the SARS-CoV-2 pandemic, the authors were not able to gather a higher and more differentiated study sample, which may have affected some outcomes, as it was mentioned above. Although they achieved interesting results in this study, they are aware that the study must be reproduced and amplified so there is stronger evidence regarding these outcomes in TMJ arthroscopy.

Conclusions

From the authors' knowledge, this is the first study evaluating the evolution of the masticatory function towards different foods, with different grades of hardness and calibers, and of the relief of symptoms, other than pain, that may, as well, impact the quality of life of patients suffering from TMD, over the postoperative recovery of TMJ arthroscopy.

Therefore, the authors of this study believe they used innovative outcomes for the evaluation of the postoperative recovery after TMJ surgery and, consequently, there are no other studies in the field of TMJ surgery that can be used to directly compare these results with.

In this study, TMJ arthroscopy, as a minimally invasive technique, appeared to be effective to reduce pain, and other related symptoms, in patients included in categories 2-4 of the Dimitroulis Classification, with reduced need of pain killers in the 30 days following this surgical intervention. Following the first 15 days, the masticatory capacity seems to be close to "normal" and patients seem to be able to return to "normal" activity. Overall, the patients referred to high levels of satisfaction.

Finally, the authors of this study believe these results will allow more detailed and rigorous information for patients submitted to TMJ arthroscopy, improving the surgical experience.

REFERENCES

Abboud, W., Nadel, S., Yarom, N., & Yahalom, R. (2016). Arthroscopy of the Temporomandibular Joint for the Treatment of Chronic Closed Lock. *The Israel Medical Association journal: IMAJ, 18*(7), 397–400.

Al-Moraissi, E. A., Wolford, L. M., Ellis III, E., & Neff, A. (2020). The hierarchy of different treatments for arthrogenous temporomandibular disorders: A network meta-analysis of randomized clinical trials. *Journal of cranio-maxillo-facial surgery: official publication of the European Association for Cranio-Maxillo-Facial Surgery, 48*(1), 9-23. doi:10.1016/j.jcms.2019.10.004

Ângelo, D. F. (2018). Morphofunctional analysis of temporomandibular joint after bilateral discectomy and discopexy. Preclinical study. *PhD thesis*.

Ângelo, D. F., Araújo, R. A., & Sanz, D. (2021). Surgical complications related to temporomandibular joint arthroscopy: a prospective analysis of 39 single-portal versus 43 double-portal procedures. *International journal of oral and maxillofacial surgery, 50*(8), 1089-1094. doi:10.1016/j.ijom.2020.07.020

Ângelo, D. F., Morouço, P., Alves, N., Viana, T., Santos, F., González, R., . . . Pinho, M. (2016). Choosing sheep (Ovis aries) as animal model for temporomandibular joint research: Morphological, histological and biomechanical characterization of the joint disc. *Morphologie: bulletin de l'Association des anatomistes, 100*(331), 223-233. doi:10.1016/j.morpho.2016.06.002

Bae, Y., & Park, Y. (2013). The Effect of Relaxation Exercises for the Masticator Muscles on Temporomandibular Joint Dysfunction (TMD). *Journal of physical therapy science, 25*(5), 583-586. doi:10.1589/jpts.25.583

Bhatka, R., Throckmorton, G. S., Wintergerst, A. M., Hutchins, B., & Buschang, P. H. (2004). Bolus size and unilateral chewing cycle kinematics. *Archives of oral biology, 49*(7), 559–566. doi:10.1016/j.archoralbio.2004.01.014

Bronstein, S., & Merrill, R. (1992). Clinical staging for TMJ internal derangement: Application to arthroscopy. *Journal of craniomandibular disorders: facial & oral pain, 6*, 7-16.

Chowdhury, S., Saxena, V., Rajkumar, K., & Shadamarshan, R. A. (2019). Evaluation of Total Alloplastic Temporomandibular Joint Replacement in TMJ Ankylosis. *Journal of Maxillofacial and Oral Surgery, 18*(2), 293-298. doi:10.1007/s12663-018-1136-x

Davis, C. M., Hakim, M., Choi, D. D., Behrman, D. A., Israel, H., & McCain, J. P. (2020). Early Clinical Outcomes of Arthroscopic Management of the Failing Alloplastic Temporomandibular Joint Prosthesis. *Journal of oral and maxillofacial surgery: official journal of the American Association of Oral and Maxillofacial Surgeons, 78*(6), 903–907. doi:10.1016/j.joms.2020.01.005

De Rossi, S., Greenberg, M., Liu, F., & Steinkeler, A. (2014). Temporomandibular disorders: evaluation and management. *The Medical clinics of North America, 98*(6), 1353–1384. doi:10.1016/j.mcna.2014.08.009

Dimitroulis, G. (2013). A new surgical classification for temporomandibular joint disorders. *International journal of oral and maxillofacial surgery, 42*(2), 218-222. doi:10.1016/j.ijom.2012.11.004

Drake, R. L., Vogl, A. W., & Mitchell, A. W. (2009). *Gray's Anatomy for Students* (2nd ed.). Churchill Livingstone.

Dworkin, S. F., & LeResche, L. (1992). Research diagnostic criteria for temporomandibular disorders: review, criteria, examinations and specifications, critique. *Journal of craniomandibular disorders: facial & oral pain, 6*(4), 301–355.

Fricton, J. R. (1995). Management of masticatory myofascial pain. *Seminars in orthodontics, 1*(4), 229–243. doi:10.1016/s1073-8746(95)80054-9

González-García, R. (2015). The current role and the future of minimally invasive temporomandibular joint surgery. *Oral and maxillofacial surgery clinics of North America, 27*(1), 69-84. doi:10.1016/j.coms.2014.09.006

Goudot, P., Jaquinet, A. R., Hugonnet, S., Haefliger, W., & Richter, M. (2000). Improvement of pain and function after arthroscopy and arthrocentesis of the temporomandibular joint: a comparative study. *Journal of cranio-maxillo-facial surgery: official publication of the European Association for Cranio-Maxillo-Facial Surgery, 28*(1), 39-43. doi:10.1054/jcms.1999.0103

Kinard, B. E., Bouloux, G. F., Prahalad, S., Vogler, L., & Abramowicz, S. (2016). Arthroscopy of the Temporomandibular Joint in Patients With Juvenile Idiopathic Arthritis. *Journal of oral and maxillofacial surgery: official journal of the American Association of Oral and Maxillofacial Surgeons, 74*(7), 1330-1335. doi:10.1016/j.joms.2016.01.028

Laskin, D. M. (2018). Arthroscopy Versus Arthrocentesis for Treating Internal Derangements of the Temporomandibular Joint. *Oral and maxillofacial surgery clinics of North America, 30*(3), 325–328. doi:10.1016/j.coms.2018.04.008

Liu, F., & Steinkeler, A. (2013). Epidemiology, diagnosis, and treatment of temporomandibular disorders. *Dental clinics of North America, 57*(3), 465–479. doi:10.1016/j.cden.2013.04.006

Locker, D., & Slade, G. (1988). Prevalence of symptoms associated with temporomandibular disorders in a Canadian population. *Community dentistry and oral epidemiology, 16*(5), 310-313. doi:10.1111/j.1600-0528.1988.tb01783.x

McCain, J. P. (1988). Arthroscopy of the human temporomandibular joint. *Journal of oral and maxillofacial surgery: official journal of the American Association of Oral and Maxillofacial Surgeons, 46*(8), 648-655. doi:10.1016/0278-2391(88)90107-3

McCain, J. P., Hossameldin, R. H., Srouji, S., & Maher, A. (2015). Arthroscopic discopexy is effective in managing temporomandibular joint internal derangement in patients with Wilkes stage II and III. *Journal of oral and maxillofacial surgery: official journal of the American Association of Oral and Maxillofacial Surgeons, 73*(3), 391–401. doi:10.1016/j.joms.2014.09.004

Murakami, K.-I. (2021). Current role of arthrocentesis, arthroscopy and open surgery for temporomandibular joint internal derangement with inflammatory/degenerative disease; -Pitfall and Pearl-. *Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology*, xxx-xxx. doi:10.1016/j.ajoms.2021.03.006

Nascimento, G. (2017). A mastigação nos diferentes ciclos de vida. *PhD thesis*.

Nourallah, H., & Johansson, A. (1995). Prevalence of signs and symptoms of temporomandibular disorders in a young male Saudi population. *Journal of oral rehabilitation, 22*(5), 343-347. doi:10.1111/j.1365-2842.1995.tb00783.x

O'Connor, R. C., Fawthrop, F., Salha, R., & Sidebottom, A. J. (2017). Management of the temporomandibular joint in inflammatory arthritis: Involvement of surgical procedures. *European journal of rheumatology, 4*(2), 151–156. doi:10.5152/eurjrheum.2016.035

Peyron, M. A., Blanc, O., Lund, J. P., & Woda, A. (2004). Influence of age on adaptability of human mastication. *Journal of neurophysiology, 92*(2), 773-779. doi:10.1152/jn.01122.2003

Peyron, M. A., Lassauzay, C., & Woda, A. (2002). Effects of increased hardness on jaw movement and muscle activity during chewing of visco-elastic model food. *Experimental brain research, 142*(1), 41-51. doi:10.1007/s00221-001-0916-5

Peyron, M. A., Woda, A., Bourdiol, P., & Hennequin, M. (2017). Age-related changes in mastication. *Journal of oral rehabilitation, 44*(4), 299-312. doi:10.1111/joor.12478

Rantala, M. A., Ahlberg, J., Suvinen, T. I., Nissinen, M., Lindholm, H., Savolainen, A., & Könönen, M. (2003). Temporomandibular joint related painless symptoms, orofacial pain, neck pain, headache, and psychosocial factors among non-patients. *Acta odontologica Scandinavica, 61*(4), 217-222. doi:10.1080/00016350310004089

Roberts, W. E., & Goodacre, C. J. (2020). The Temporomandibular Joint: A Critical Review of Life-Support Functions, Development, Articular Surfaces, Biomechanics and Degeneration. *Journal of prosthodontics: official journal of the American College of Prosthodontists, 29*(9), 772-779. doi:10.1111/jopr.13203

Schiffman, E., Ohrbach, R., Truelove, E., Look, J., Anderson, G., Goulet, J.-P., . . . Orofacial Pain Special Interest Group, I. (2014). iagnostic Criteria for Temporomandibular Disorders (DC/TMD) for Clinical and Research Applications: recommendations of the International RDC/TMD Consortium Network* and Orofacial Pain Special Interest Group†. *Journal of oral & facial pain and headache, 28*(1), 6–27. doi:10.11607/jop.1151

Schwartz, G., Enomoto, S., Valiquette, C., & Lund, J. P. (1989). Mastication in the rabbit: a description of movement and muscle activity. *Journal of neurophysiology, 62*(1), 273–287. doi:10.1152/jn.1989.62.1.273

Standring, S. (2016). *Gray's Anatomy, The Anatomical Basis of Clinical Practice* (41st ed.). Elsevier.

Su, N., Liu, Y., Yang, X., Shen, J., & Wang, H. (2016). Correlation between oral health-related quality of life and clinical dysfunction index in patients with temporomandibular joint osteoarthritis. *Journal of oral science, 58*(4), 483-490. doi:10.2334/josnusd.16-0224

Suvinen, T. I., Reade, P. C., Kemppainen, P., Könönen, M., & Dworkin, S. F. (2005). Review of aetiological concepts of temporomandibular pain disorders: towards a biopsychosocial model for integration of physical disorder factors with psychological and psychosocial illness impact factors. *European journal of pain (London, England), 9*(6), 613-633. doi:10.1016/j.ejpain.2005.01.012

Tewksbury, C. D., Callaghan, K. X., Fulks, B. A., & Gerstner, G. E. (2018). Individuality of masticatory performance and of masticatory muscle temporal parameters. *Archives of oral biology, 90*, 113–124. doi:10.1016/j.archoralbio.2018.03.007

Tonni, I., Riccardi, G., Piancino, M. G., Stretti, C., Costantinides, F., & Paganelli, C. (2020). The influence of food hardness on the physiological parameters of mastication: A systematic review. *Archives of oral biology, 120*, 104903. doi:10.1016/j.archoralbio.2020.104903

Trawitzki, L. V., Silva, J. B., Regalo, S. C., & Mello-Filho, F. V. (2011). Effect of class II and class III dentofacial deformities under orthodontic treatment on maximal isometric bite force. *Archives of oral biology, 56*(10), 972–976. doi:10.1016/j.archoralbio.2011.02.018

Trize, D., Calabria, M., Franzolin, S., Cunha, C., & Marta, S. (2018). Is quality of life affected by temporomandibular disorders? *Einstein (Sao Paulo, Brazil), 16*(4), eAO4339. doi:10.31744/einstein_journal/2018AO4339

van der Bilt, A. (2011). Assessment of mastication with implications for oral rehabilitation: a review. *Journal of oral rehabilitation, 38*(10), 754–780. doi:10.1111/j.1365-2842.2010.02197.x

White, S. E. (2020). *Basic & Clinical Biostatistics* (5e ed.). McGraw Hill.

Wilk, B. R., Stenback, J. T., & McCain, J. P. (1993). Postarthroscopy physical therapy management of a patient with temporomandibular joint dysfunction. *The Journal of orthopaedic and sports physical therapy*, 473–478. doi:10.2519/jospt.1993.18.3.473

Wilkes, C. H. (1989). Internal derangements of the temporomandibular joint. Pathological variations. *Archives of otolaryngology: head & neck surgery, 115*(4), 469–477. doi:10.1001/archotol.1989.01860280067019

Woda, A., Foster, K., Mishellany, A., & Peyron, M. A. (2006). Adaptation of healthy mastication to factors pertaining to the individual or to the food. *Physiology & behavior, 89*(1), 28-35. doi:10.1016/j.physbeh.2006.02.013

Yule, P. L., Durham, J., Playford, H., Moufti, M. A., Steele, J., Steen, N., . . . Ohrbach, R. (2015). OHIP-TMDs: a patient-reported outcome measure for temporomandibular disorders. *Community dentistry and oral epidemiology, 43*(5), 461-470. doi:10.1111/cdoe.12171

Zhang, C., Wu, J.-Y., Deng, D.-L., He, B.-Y., Tao, Y., Niu, Y.-M., & Deng, M.-H. (2016). Efficacy of splint therapy for the management of temporomandibular disorders: a meta-analysis. *Oncotarget, 7*(51), 84043–84053. doi:10.18632/oncotarget.13059

Zhao, L., & Monahan, R. (2007). Functional assessment of the stomatognathic system. *Clinics in plastic surgery, 34*(3), e1-e9. doi:10.1016/j.cps.2007.04.003

APPENDIX 1 – APPROVAL BY THE ETHICS COMMITTEE OF *CAML*

CENTRO ACADÉMICO DE MEDICINA DE LISBOA

Presidente
Prof. Doutor João Forjaz Lacerda

Vice-Presidente
Profª. Doutora Helena Cortez-Pinto

Membros
Profª. Doutora Ana Isabel Lopes
Doutora Carla Fonseca
Profª. Doutora Claudia Sofia Oliveira Dias Monge
Prof. Doutor Daniel Caldeira
Profª Doutora Dulce Brito
Mestre Enfermeira. Graça Roldão
Prof. Doutor João Lavinha
Dra. Laura Silva Dias
Profª. Doutora Maria do Céu Patrão Neves

Exmo. Senhor

Dr. Carlos André Prior Antunes

Lisboa, 14 de Julho de 2021

Nossa Refª. Nº 45/21

Assunto: Projeto "**Postoperative recovery after TMJ arthroscopy. A prospective study**"

Relator: *Profª. Doutora Dulce Brito*

Pela presente se informa que o projeto citado em epígrafe a realizar no âmbito do Mestrado integrado em Medicina da Faculdade de Medicina da Universidade de Lisboa, obteve, na reunião ocorrida em 5 de Julho de 2021, parecer favorável da Comissão de Ética, considerando-se observados os imperativos que fundeiam as Boas práticas clínicas, os preceitos internacionalmente reconhecidos de qualidade ética e científica que devem ser respeitados na conceção e na realização dos estudos clínicos que envolvam a participação de seres humanos.

No uso das competências próprias constantes do disposto no Decreto-Lei. N.º 97/95 de 10 de Maio, e no exercício das suas funções em observância ao deliberado na Lei n.º 21/2014 de 16 de Abril, que aprova a lei da investigação clínica, na sua atual redação alterada pela Lei n.º 73/2015 de 27/07/15, complementada pelo Decreto-Lei n.º 80/2018 (DR n.º 198-2018, Série I de 2018/10/15) que reforça o papel das comissões de ética no contexto da instituição em que se integram, na sua missão de contribuir para o cumprimento de princípios da ética e da bioética, na prestação de cuidados de saúde e na realização de investigação clínica, e ainda em harmonia com os regulamentos internos do CHULN, os códigos deontológicos, as convenções, e as recomendações constantes das declarações e diretrizes internacionais, designadamente as Declarações de Helsínquia a de Tóquio, da Organização Mundial de Saúde e da União Europeia, a Comissão de Ética avaliou o projeto, que considera obedecer aos requisitos éticos fundamentais que devem ser respeitados, refletindo o primado da dignidade e da integridade humanas.

Encontra-se assegurado o direito à integridade moral e física do participante, cumpre as precauções essenciais, cujo desígnio visa minimizar eventuais danos para os seus direitos de personalidade, bem como o direito à privacidade e à proteção dos dados pessoais que lhe dizem respeito, respeitando os imperativos refletidos no Regulamento Geral sobre a Proteção de Dados (RGPD) entrado em vigor em 25 de Maio de 2016 e plenamente aplicável a partir de 25 de Maio de 2018, (Regulamento (UE) 2016/679 do Parlamento Europeu e do Conselho de 27/04/16), de 27 de abril, publicado no Jornal Oficial da União Europeia, no dia 4 de Maio de 2016, e na Lei n.º 58/2019, de 8 de Agosto.

Com os melhores cumprimentos

O Presidente da Comissão de Ética do CAML

Prof. Doutor João Forjaz de Lacerda

COMISSÃO DE ÉTICA DO CAML
AVENIDA PROFESSOR EGAS MONIZ
1649-035 LISBOA
TEL. – 21 780 54 05; FAX – 21 780 56 90
ANA.PIMENTEL@CHLN.MIN-SAUDE.PT

ALAMEDA DAS LINHAS DE TORRES, 117
1769-001 LISBOA
Tel: 217 548 000 – Fax: 217 548 215
www.chln.pt

1

APPENDIX 2 – OUTPATIENT INDICATIONS AFTER ORAL AND MAXILLOFACIAL SURGERY

[The following information was adapted and translated from the Portuguese (version handed to the participants) to English]

MEDICATION

Medication / Drug	Dosage	Duration
Amoxicillin + Clavulanate (875 mg + 125 mg)	1 pill → 12/12 h	8 days
Clonixin (300 mg)	1 capsule → 8/8 h	5 days
Paracetamol + Thiocolchicoside (500 mg + 2 mg)	2 pills → 8/8 h	5 days
Esomeprazole (20 mg)	1 pill → 24/24h	5 days
Tramadol (50 mg)	1 pill → 12/12 h	SOS → If pain persists. Take Ondansetron and Tramadol together
Ondansetron (4 mg)	1 pill → 12/12 h	

Note: If there is a reported allergy to Amoxicillin and/or Clavulanate, you must substitute for Clarithromycin (Dosage: 500 mg; 1 pill | Frequency: 12/12 h | Duration: 8 days).

Methylprednisolone	Breakfast	Lunch	Dinner
Postoperative D1	8 mg	8 mg	8 mg
Postoperative D2	8 mg	8 mg	4 mg
Postoperative D3	8 mg	4 mg	4 mg
Postoperative D4	4 mg	4 mg	4 mg
Postoperative D5	4 mg	4 mg	4 mg

GENERAL RECOMMENDATIONS

1. Ice must be applied to the surgical site for 20-minute periods, with 20-minute periods apart of rest.
2. You should sleep with the headboard elevated at 45º, for a duration of 3 days.
3. You should maintain a liquid, soft and cold diet in the first 3-5 postoperative days.
4. You should maintain rigorous oral hygiene with the kit given to you by the *IPFACE*: soft brush, alcohol-free mouthwash (4/4h), and Elugel®.
5. Tramadol and Ondansetron should be taken together (SOS pain).
6. In case of doubts, please contact *IPFACE* nurse, whom is directly in contact with your assistant surgeon.
7. *IPFACE* nurse should only be contacted if needed, after hospital stay.
8. In case of pain persistence, contact the anesthesiologist.

APPENDIX 3 – LIST OF FOODS AND HOW TO PREPARE

[The following information was translated from the Portuguese (version handed to the participants) to English]

With the purpose of evaluating the evolution in the postoperative period after TMJ arthroscopy, the following foods will be provided to the participant. These foods should be prepared according to the following instructions:

- A potato, with 25-35 mm of caliber, should be boiled for 15 minutes and be let to cool for another 15 minutes, before ingestion.
- A slice of loaf bread, of the Bimbo® brand, should have no crust.
- A brioche bread, of the Bimbo® brand, should be broken in half.
- A “Maria” cookie, of the Vieira ® brand.
- An almond should not be cooked nor peeled.

These foods should not be broken into smaller pieces (than indicated above) nor be kept inside the mouth too long (softening the food), because these factors might interfere with the results.

The foods should be ingested on the days when there will be an interview. Whenever you should feel any kind of discomfort towards the mastication of any of the foods, stop. You should not force the mastication.

Thank you for your cooperation. We hope that the results of this study may help other patients in the future.