Quality of Life After Total Temporomandibular Joint Prothesis Surgery.

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Abstract

Introduction: Total temporomandibular joint (TMJ) prostheses are increasingly used in patients with joint destruction presenting significant pain and mouth opening limitation. This surgery can be considered as the last resort solution whose goal is to restore the mandible function. The aim of this study was to evaluate the patient quality of life (QoL) before and after TMJ replacement surgery with a total TMJ prosthesis, using a modified quality of life scale.

Material and Methods: All patients with a total uni or bilateral TMJ prosthesis who could be contacted were included. All patients completed two retrospective questionnaires: once relative to the pre-operative QoL and another for the post-operative QoL, including the assessment of mouth opening limitation, daily eating difficulties and also a QoL score, adapted from the TMJ-QoL questionnaire.

Results: A total of 17 patients were included: 13 temporomandibular ankylosis, 3 condylar resorptions and one congenital malformation. Mouth opening limitation and daily eating difficulties were significantly reduced after surgery ($p<0.001$). 9 of the 11 QoL questions

showed a significant decrease in score and thus an improvement of the QoL after surgery: having a conversation ($p=0.006$), eating ($p<0.001$), yawning ($p<0.001$), sleeping ($p=0.043$), recreational activities ($p=0.005$), relaxing ($p= 0.021$), feeling depressed because of TMJ problems ($p=0.032$), daily activities ($p=0.008$) and patient self-assessment of QoL ($p=0.003$). 2 showed no significant difference: taking analgesics, and social life. Total score of QoL showed a significant improvement ($p=0.003$).

Conclusion: Quality of life, mouth opening, and daily eating were significantly improved after total TMJ prosthesis, in agreement with the litterature. The TMJ prosthesis could be considered ealier in the management of end-stage temporomandibular disease.

Keywords: Total joint replacement, temporomandibular disorders, TMJ reconstruction, quality of life

Introduction

Total temporomandibular joint (TMJ) prostheses are increasingly used in the management of temporomandibular joint pathology. Joint replacement surgery by total TMJ prosthesis has evolved considerably over the past 30 years [1,2]. These prostheses are indicated in patients with joint destruction presenting significant pain and a disabling mandible movement including mouth opening limitation. They will be increasingly used in the coming years [3]. In some cases, they are used in the terminal evolution of temporomandibular disorders (TMD). TMD are multifactorial conditions and their frequencies are roughly estimated between 5 to 12% of the population in industrialized countries [4,5]. Indeed, these myoarthropathies, responsible for orofacial pain and very important functional repercussions, can lead to a complete ankylosis of the joint, with a severe alteration of the Quality of Life (QoL). Less frequently, other conditions such as systemic pathologies including rheumatoid polyarthritis and ankylosing spondylitis, idiopathic condylar resorption, or malformative abnormalities can also require TMJ replacements. In reconstructive surgery there are also indications for TMJ prosthesis after tumor resection or mandibular destruction after bone infection [2,6–8].

This surgery can be considered as the last resort solution whose goal is to restore the mandible function. However complications (infection, facial paralysis or dysesthesia) have been described and the results are controversial [2,9]. For dentate patients, a study conducted by Dimitroulis showed that prosthetic joints prove to be the most dependable of all treatment options, with no returns to theatre and highly favourable quality of life outcomes (TMJ-S-QoL) compared to chondrocostal graft or condylectomy [10]. The results appear similar in several other well-conducted studies with improvements in pain, dietary intake, and mouth opening [11,12]. In addition, the complications reported in these studies seemed to be acceptable (rates of temporary facial nerve palsy of 12.5% to 32%[11]). De Roo et al. also showed significant

improvement in mouth opening with total TMJ prostheses but similar to other surgical techniques for temporomandibular ankylosis [6].

Two types of prostheses are mainly used: stock or custom-made implants marketed by two major brands Biomet Microfixation TMJ replacement system®, and TMJ Concept prosthesis®, with similar results relative to improvement in mouth opening and reduction of pain [2,8,12–15].

Several scales exist to assess QoL in patients presenting a TMJ pathology and can be applied to patients who undergone total TMJ prosthesis surgery such as the Oral Health Impact Profile questionnaires (OHIP-14, OHIP-TMDs), the Oral Health-related Quality of Life (OHRQoL), the temporomandibular joint replacement quality of life questionnaire (TMJ-QoL), short form 36 (SF36) quality of life questionnaire [16–21].

The purpose of this study was to evaluate the patient QoL before and after TMJ replacement surgery with a total TMJ prosthesis, using a modified quality of life scale.

Materials and methods

This observational study was conducted in the maxillofacial surgery department of the University Hospital of Lille. All patients who have undergone a total uni or bilateral temporomandibular joint prosthesis from October 2009 to September 2021 were included. All were treated by a single surgeon and were followed up regularly. All the patients had a total joint reconstruction with Biomet stock implants except for 1 patient who received custom-made TMJ concept prostheses. All study procedures were performed in accordance with the ethical standards of the Helsinki Declaration. Data were anonymized, and the "Commission Nationale de l'Informatique et des Libertés de France » (CNIL) declaration was performed in accordance with French law.

Assessment of quality of life

The data were collected by using QoL questionnaires either by telephone or by return e-mail. The questionnaire, as shown in Supplemental Table 1, included the presence or not of a mouth opening limitation, the presence or not of daily eating difficulties and also a QoL score, adapted from the TMJ replacement QoL questionnaire (TMJ-QoL) [19,20]. It consists of 11 questions with 5 points each, which cover physical, functional and psychosocial aspects of patients' lives. The scores range from 11 to 55. All patients completed two retrospective questionnaires: once relative to the pre-operative QoL and another for the post-operative QoL (at least 6 months after surgery).

Statistical analyses

Data were expressed as the mean ± standard deviation (SD) or the pourcentage of positive response unless otherwise specified. Statistical analyses were paired as we compared pre- and post-operative answers. We used the Shapiro-Wilk test to know whether Student t test or a Wilcoxon test was necessary for continuous variables. For the proportion, we used

the McNemar’s paired chi 2 test. A p-value of 0.05 was defined as the threshold of statistical significance.

Results

Among 19 patients who received a total TMJ prothesis, two patients were excluded: one who could not be reached, and one case of infection that required the removal of the prosthesis before six months of follow-up. A total of 17 patients who had TMJ replacement were included. Eleven (64.7%) were females and 6 (35.3%) were males, with a median age of 35 (19-72) at the time of operation. Thirteen patients (76.5%) had temporomandibular ankylosis, 4 of them in a context of rheumatoid pathology (3 rheumatoid arthritis, 1 ankylosing spondylitis). Three patients (17.6%) had condylar resorption. One patient (5.9%) had a congenital malformation: Goldenhar syndrome. Among the demographic data, we were not able to collect the previous number of temporomandibular surgeries for all patients (6 missing data out of 17), but it should be noted that at least 6 patients had more than 2 surgeries before TMJ replacement.

Figure 1 and Supplemental Table 2 showed the results and the comparison of pre- and post-operative questionnaire in patients who have undergone total TMJ prothesis surgery. The rate of mouth opening limitation was significantly reduced after surgery (17 patients (100%) to 7 patients (41.2%); $p<0.001$). Daily eating difficulties were also significantly reduced (17 patients (100%) to 7 patients (41.2%); $p<0.001$). Regarding the 11 QoL questions asked, 9 showed a significant decrease in score and thus an improvement of the QoL after surgery: having a conversation (2.47(1.23) to 1.41(0.80); $p=0.006$), eating (3.35(0.93) to 1.71(0.99); $p<0.001$), yawning (3.06(1.68) to 1.53(1.01); $p<0.001$), sleeping (2.24(1.44) to 1.35(0.70); $p=0.043$), recreational activities (2.59(1.58) to 1.53(1.12); $p=0.005$), relaxing (2.53(1.66) to 1.29(0.69); $p= 0.021$), feeling depressed because of TMJ problems (3.06(1.56) to 1.82(1.33), $p=0.032$), daily activities (3.41(1.28) to 2.12(1.45); $p=0.008$) and patient self-assessment of QoL (3.53(1.18) to 2.00(1.22); $p=0.003$). Therefore, 2 showed no significant difference: taking analgesics, and social life. Significant improvement in QoL was noted with a significant decrease in the total score from 31.82 (12.41) to 18.47 (9.06); $p=0.003$.

Discussion

Total TMJ prostheses currently represent the last resort for the treatment of severe TMJ pathologies with precise indications. Aim is not to restore the anatomy, but to restore function and reduce pain, thus improving the QoL of patients.

The results of this study were in accordance with the literature by showing an overall improvement in QoL, a decrease in pain, an improvement in mouth opening and in diet [2,10–12,16,22]. They are significant despite the small number of patients. This number of patients remains relevant for a monocentric study. The results on each question seemed to show an improvement in the daily functional aspect and psychological aspect: having a conversation, eating, yawning, sleeping, relaxing, daily or recreational activities and feeling depressed. This is consistent with the fact that patient self-assessment of QoL shows a significant improvement after total TMJ prothesis. On the other side, the intake of analgesics and social life did not show any significant improvement but seem to have better scores after the intervention. Some studies showed a significant decrease in pain after prosthetic replacement and identified that patients who have been chronically using strong analgesics for several years and patients who have undergone several previous TMJ surgeries show less improvement in pain and require special, multidisciplinary management of pain after surgery[15,23,24]. The non-significance of our results regarding pain can also be explained by the small number of patients.

Pain was assessed by the need to take analgesics before and after the procedure. Indeed, since the data was collected retrospectively, this measure seems more objective and reproducible than the visual analog scale. The questionnaire used in this study is adapted from the TMJ-QoL scale, which is specific to QoL in temporomandibular dysfunctions, by assessing oral functions and their impact while appearing clearer for patients and more discriminating than the OHIP and OHRQoL scales [17–20,22].

Studies showed that the more previous temporomandibular surgeries were performed (2 or more interventions), the less improvement in symptoms, especially regarding pain, and QoL in patients who have undergone total TMJ protheses surgery [24,25]. Total TMJ prostheses are considered the last surgical option for end-stage TMJ pathologies and should be considered after failure of less invasive treatments [23], but it should be noted that the number of previous interventions decreases the chances of post-operative improvement. Therefore, for multioperated patients, it remains the best option. In this study, at least 6 patients (35.3%) underwent more than two procedures before total TMJ prostheses. The lack of these data for six patients may be a bias in overestimating the success rate of TMJ prostheses if the number of patients who have undergone at least two procedures is less than the general population who have undergone TMJ prosthesis surgery. However, our results are consistent with the literature. Among the 6 patients with more than two previous procedures, 5 showed an improvement of the QoL after surgery. This surgery thus seems to be an effective means in helping patients who present with severe TMJ suffering.

In this study, two types of prostheses were used and chosen according to the surgical indication. The fact that 1 out of 17 patients received a custom-made TMJ concept, and all other patients a Biomet stock implant, does not represent a bias since custom-made prosthesis must be used in precise indications on a case-by-case basis, especially when the anatomy of the temporomandibular region is very modified. Studies have shown an equivalence of results between stock and custom prostheses [13–15].

The pathologies in this study are varied and representative of the indications for total TMJ replacements. One patient had congenital malformations: Goldenhar syndrome and had received a custom-made TM concept. In this case, the results showed a significant improvement in mouth opening, eating difficulties and quality of life after total TMJ prosthesis surgery. Total TMJ protheses has a place in certain malformative abnormalities but it should be noted that the

indications may be limited in severe cases due to insufficient soft tissues that do not allow the placement of the prosthesis, directly due to the malformation but also due to fibrous scar retraction following previous surgeries [26]. Total TMJ prothesis remains a tool for the management of malformative temporomandibular pathologies allowing an improvement of the QoL, with a particular relevance for the custom-made prosthesis and the interest of a 3D planning which needs to be evaluated on a case-by-case basis [27].

Finally, the question of prosthetic wear is an important issue to discuss in this context of total TMJ prosthesis. Only a few studies have reported data on revision or replacement rates of prostheses such as Leandro et al (n=300) who found no revision surgeries over 10 years [28]. Wolford et al (n=111) showed persistence of clinical improvement over 20 years after total TMJ prosthesis surgery (TMJ Concept) and no devices were removed due to material wear [25]. The most frequent reasons for revision or replacement when necessary seem to be infection and recurrence of ankylosis with heterotopic ossification [29,30]. In this study, we have up to 12 years of follow-up for some patients and none of the total TMJ prostheses of the 17 patients required replacement due to wear.

Conclusion

The results of this study, in agreement with the literature, showed a significant improvement in the quality of life, in mouth opening and daily eating, and a significant decrease in pain in patients who have received a total TMJ prosthesis. This surgery has revolutionized the management of end-stage temporomandibular disease and is becoming more and more common. Indeed, the TMJ prosthesis represents one of the last resorts but knowing that the functional prognosis is decreased in patients having undergone more than two previous interventions, it would be necessary to think about the prosthesis perhaps earlier in the management of certain patients presenting with great suffering. It would also be interesting to study the interest of prosthesis in malformative abnormalities in order to specify the indications.

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Declarations of interest: none

References

[1] Driemel O, Braun S, Müller-Richter UDA, Behr M, Reichert TE, Kunkel M, et al. Historical development of alloplastic temporomandibular joint replacement after 1945 and state of the art. International Journal of Oral and Maxillofacial Surgery 2009;38:909–20. https://doi.org/10.1016/j.ijom.2009.01.022.

[2] Yoda T, Ogi N, Yoshitake H, Kawakami T, Takagi R, Murakami K, et al. Clinical guidelines for total temporomandibular joint replacement. Japanese Dental Science Review 2020;56:77–83. https://doi.org/10.1016/j.jdsr.2020.03.001.

[3] Lotesto A, Miloro M, Mercuri LG, Sukotjo C. Status of alloplastic total temporomandibular joint replacement procedures performed by members of the American Society of Temporomandibular Joint Surgeons. International Journal of Oral and Maxillofacial Surgery 2017;46:93–6. https://doi.org/10.1016/j.ijom.2016.08.002.

[4] Schiffman E, Ohrbach R, Truelove E, Look J, Anderson G, Goulet J-P, et al. Diagnostic 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†. J Oral Facial Pain Headache 2014;28:6–27. https://doi.org/10.11607/jop.1151.

[5] Nicot R. Étiopathogénie des dysfonctions temporomandibulaires. EMC - Chirurgie orale et maxillo-faciale 2020;33(4):1-11 [Article 22-056-A-10].

[6] De Roo N, Van Doorne L, Troch A, Vermeersch H, Brusselaers N. Quantifying the outcome of surgical treatment of temporomandibular joint ankylosis: A systematic review and meta-analysis. Journal of Cranio-Maxillofacial Surgery 2016;44:6–15. https://doi.org/10.1016/j.jcms.2015.08.019.

[7] Sidebottom AJ. Guidelines for the replacement of temporomandibular joints in the United Kingdom. British Journal of Oral and Maxillofacial Surgery 2008;46:146–7. https://doi.org/10.1016/j.bjoms.2006.12.001.

[8] Zwetyenga N, Amroun S, Wajszczak B-L, Moris V. Prothèses totales des articulations temporomandibulaires. Revue de Stomatologie, de Chirurgie Maxillo-faciale et de Chirurgie Orale 2016;117:285–93. https://doi.org/10.1016/j.revsto.2016.07.016.

[9] Stricker M, Simon E. Chirurgie de l'articulation temporomandibulaire et sa rééducation. EMC (Elsevier Masson SAS, Paris), Stomatologie 2011:22-056-T-15.

[10] Dimitroulis G. Comparison of the outcomes of three surgical treatments for end-stage temporomandibular joint disease. International Journal of Oral and Maxillofacial Surgery 2014;43:980–9. https://doi.org/10.1016/j.ijom.2014.02.004.

[11] Elledge R, Attard A, Green J, Lowe D, Rogers SN, Sidebottom AJ, et al. UK temporomandibular joint replacement database: a report on one-year outcomes. British Journal of Oral and Maxillofacial Surgery 2017;55:927–31. https://doi.org/10.1016/j.bjoms.2017.08.361.

[12] Giannakopoulos HE, Sinn DP, Quinn PD. Biomet Microfixation Temporomandibular Joint Replacement System: A 3-Year Follow-Up Study of Patients Treated During 1995 to 2005. Journal of Oral and Maxillofacial Surgery 2012;70:787–94. https://doi.org/10.1016/j.joms.2011.09.031.

[13] Siegmund BJ, Winter K, Meyer-Marcotty P, Rustemeyer J. Reconstruction of the temporomandibular joint: a comparison between prefabricated and customized alloplastic prosthetic total joint systems. International Journal of Oral and Maxillofacial Surgery 2019;48:1066–71. https://doi.org/10.1016/j.ijom.2019.02.002.

[14] Zou L, He D, Ellis E. A Comparison of Clinical Follow-Up of Different Total Temporomandibular Joint Replacement Prostheses: A Systematic Review and Meta-Analysis. Journal of Oral and Maxillofacial Surgery 2018;76:294–303. https://doi.org/10.1016/j.joms.2017.08.022.

[15] Gerbino G, Zavattero E, Bosco G, Berrone S, Ramieri G. Temporomandibular joint reconstruction with stock and custom-made devices: Indications and results of a 14-year experience. Journal of Cranio-Maxillofacial Surgery 2017;45:1710–5. https://doi.org/10.1016/j.jcms.2017.07.011.

[16] Gupta B, Ahmed N, Sidebottom AJ. Quality of life outcomes one year after replacement of the temporomandibular joint using a modified SF36 questionnaire. British Journal of Oral and Maxillofacial Surgery 2020;58:304–8. https://doi.org/10.1016/j.bjoms.2019.12.003.
[17] Yule PL, Durham J, Playford H, Moufti MA, Steele J, Steen N, et al. OHIP-TMDs: a patient-reported outcome measure for temporomandibular disorders. Community Dentistry and Oral Epidemiology 2015;43:461–70. https://doi.org/10.1111/cdoe.12171.
[18] Almoznino G, Zini A, Zakuto A, Sharav Y, Haviv Y, Avraham H, et al. Oral Health-Related Quality of Life in Patients with Temporomandibular Disorders. Journal of Oral & Facial Pain and Headache 2015;29:231–41. https://doi.org/10.11607/ofph.1413.
[19] Villa S, Raoul G, Machuron F, Ferri J, Nicot R. Improvement in quality of life after botulinum toxin injection for temporomandibular disorder. Journal of Stomatology, Oral and Maxillofacial Surgery 2019;120:2–6. https://doi.org/10.1016/j.jormas.2018.10.007.
[20] Dimitroulis G, McCullough M, Morrison W. Quality-of-Life Survey Comparing Patients Before and After Discectomy of the Temporomandibular Joint. Journal of Oral and Maxillofacial Surgery 2010;68:101–6. https://doi.org/10.1016/j.joms.2009.07.092.
[21] John MT, Reissmann DR, Schierz O, Wassell RW. Oral health-related quality of life in patients with temporomandibular disorders. J Orofac Pain 2007;21:46–54.
[22] Kunjur J, Niziol R, Matthews NS. Quality of life: patient-reported outcomes after total replacement of the temporomandibular joint. British Journal of Oral and Maxillofacial Surgery 2016;54:762–6. https://doi.org/10.1016/j.bjoms.2016.04.022.
[23] Aagaard E, Thygesen T. A prospective, single-centre study on patient outcomes following temporomandibular joint replacement using a custom-made Biomet TMJ prosthesis. International Journal of Oral and Maxillofacial Surgery 2014;43:1229–35. https://doi.org/10.1016/j.ijom.2014.05.019.
[24] Mercuri LG, Edibam NR, Giobbie-Hurder A. Fourteen-Year Follow-Up of a Patient-Fitted Total Temporomandibular Joint Reconstruction System. Journal of Oral and Maxillofacial Surgery 2007;65:1140–8. https://doi.org/10.1016/j.joms.2006.10.006.
[25] Wolford LM, Mercuri LG, Schneiderman ED, Movahed R, Allen W. Twenty-Year Follow-up Study on a Patient-Fitted Temporomandibular Joint Prosthesis: The Techmedica/TMJ Concepts Device. Journal of Oral and Maxillofacial Surgery 2015;73:952–60. https://doi.org/10.1016/j.joms.2014.10.032.
[26] Hodzic Z, Törnwall J, Leikola J, Heliövaara A, Suojanen J. Alloplastic Temporomandibular Joint Reconstruction in Congenital Craniofacial Deformities. J Craniofac Surg 2021;32:e548–51. https://doi.org/10.1097/SCS.0000000000007533.
[27] Wolford LM, Perez DE. Surgical Management of Congenital Deformities with Temporomandibular Joint Malformation. Oral and Maxillofacial Surgery Clinics of North America 2015;27:137–54. https://doi.org/10.1016/j.coms.2014.09.010.
[28] Leandro LFL, Ono HY, de Souza Loureiro CC, Marinho K, Garcia Guevara HA. A ten-year experience and follow-up of three hundred patients fitted with the Biomet/Lorenz Microfixation TMJ replacement system. International Journal of Oral and Maxillofacial Surgery 2013;42:1007–13. https://doi.org/10.1016/j.ijom.2013.04.018.
[29] Amarista FJ, Mercuri LG, Perez D. Temporomandibular Joint Prosthesis Revision and/or Replacement Survey and Review of the Literature. Journal of Oral and Maxillofacial Surgery 2020;78:1692–703. https://doi.org/10.1016/j.joms.2020.05.021.
[30] Gakhal MK, Gupta B, Sidebottom AJ. Analysis of outcomes after revision replacement of failed total temporomandibular joint prostheses. British Journal of Oral and Maxillofacial Surgery 2020;58:220–4. https://doi.org/10.1016/j.bjoms.2019.12.009.

Figure and Supplemental Tables Legends

Supplemental Table 1: Quality of life questionnaire, adapted from the TMJ replacement QoL questionnaire (TMJ-QoL)

Supplemental Table 2: Comparison of pre- and post-operative questionnaire results in patients who have undergone total TMJ prothesis surgery

Figure 1: Comparison of pre- and post-operative questionnaire results in patients who have undergone total TMJ prothesis surgery

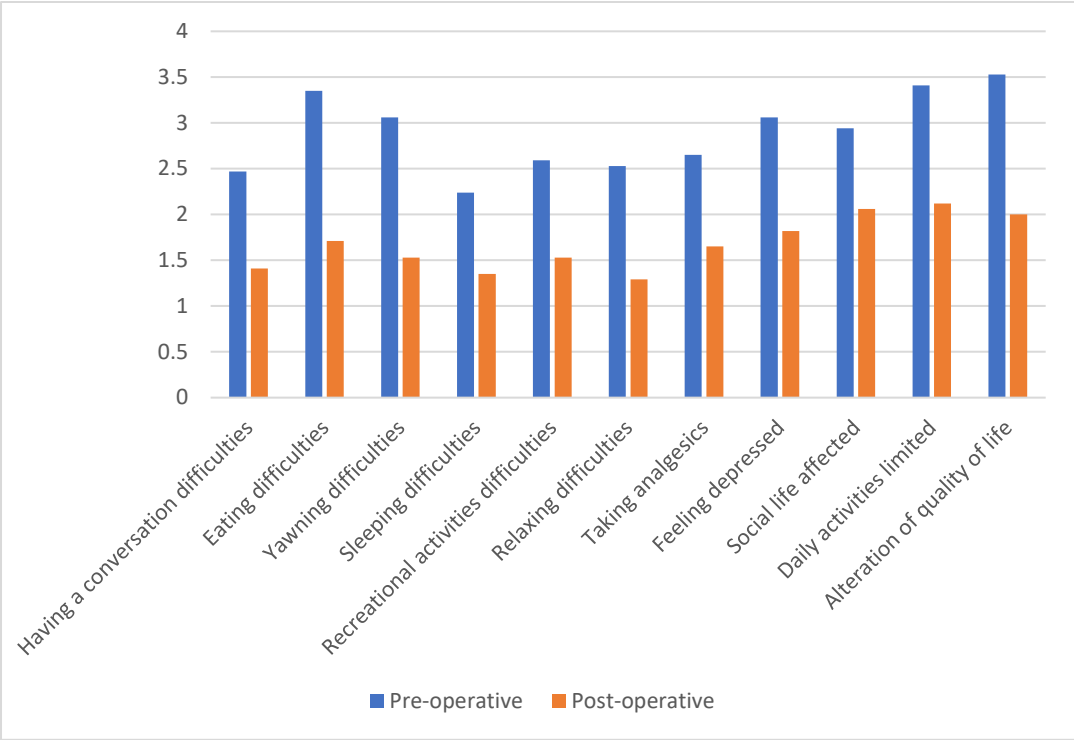

Figure 1: Comparison of pre- and post-operative questionnaire results in patients who have undergone total TMJ prothesis surgery

Supplemental Table 1: Quality of life questionnaire, adapted from the TMJ replacement QoL questionnaire (TMJ-QoL)

1. Do you have a mouth opening limitation? Yes No
2. Do you have daily eating difficulties? Yes No
3. Adaptation of the temporomandibular joint replacement quality of life questionnaire (TMJ- QoL)

	No difficulty	Mild difficulty	Moderate difficulty	Severe difficulty	Unable
Having a conversation	1	2	3	4	5
Eating	1	2	3	4	5
Yawning	1	2	3	4	5
Sleeping	1	2	3	4	5
Recreational activities	1	2	3	4	5
Relaxing	1	2	3	4	5

	Never	Rarely	Once a day	Regularly	Pain not controlled
How often do you have to take medication to control your pain?	1	2	3	4	5

	Never	Rarely	Quite often	Very often	Always
How often do you feel depressed because of your TMJ problems?	1	2	3	4	5

	Not at all	Slightly	Moderatly	Quite a bit	Extremely
How have your TMJ problems affected your social life?	1	2	3	4	5
How have your TMJ problems limited your daily activities?	1	2	3	4	5

	Very poor	Poor	Neither poor or good	Good	Extremely good
How would you rate your quality of life?	5	4	3	2	1

Supplemental Table 2: Comparison of pre- and post-operative questionnaire results in patients who have undergone total TMJ prothesis surgery

	Pre-operative evaluation N=17	Post-operative evaluation N=17	P-value	
Mouth opening limitation, *n(%)*	17 (100%)	7 (41.2%)	< 0.001	*
Daily eating difficulties, *n(%)*	17 (100%)	7 (41.2%)	< 0.001	*
Having a conversation difficulties, *moy(SD)*	2.47 (1.23)	1.41 (0.80)	0.006	*
Eating difficulties, *moy(SD)*	3.35 (0.93)	1.71 (0.99)	< 0.001	*
Yawning difficulties, *moy(SD)*	3.06 (1.68)	1.53 (1.01)	< 0.001	*
Sleeping difficulties, *moy(SD)*	2.24 (1.44)	1.35 (0.70)	0.043	*
Recreational activities difficulties, *moy(SD)*	2.59 (1.58)	1.53 (1.12)	0.005	*
Relaxing difficulties, *moy(SD)*	2.53 (1.66)	1.29 (0.69)	0.021	*
How often do you have to take medication to control your pain? *moy(SD)*	2.65 (1.84)	1.65 (1.11)	0.098	
How often do you feel depressed because of your TMJ problems? *moy(SD)*	3.06 (1.56)	1.82 (1.33)	0.032	*
How have your TMJ problems affected your social life? *moy(SD)*	2.94 (1.25)	2.06 (1.52)	0.087	
How have your TMJ problems limited your daily activities? *moy(SD)*	3.41 (1.28)	2.12 (1.45)	0.008	*
How would you rate your quality of life? *moy(SD)*	3.53 (1.18)	2.00 (1.22)	0.003	*
Total score /55	31.82 (12.41)	18.47 (9.06)	0.003	*