Systematic Review / Meta-analysis

Quality of life after extraction of mandibular wisdom teeth: A systematic review

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ABSTRACT

Objective: The objective of this systematic review was to evaluate the impact of mandibular wisdom tooth extraction on a patient’s quality of life “QoL”.

Methods: An electronic search was conducted through September 2021 on MEDLINE database, ELSEVIER-ScienceDirect, Ebsco, Scopus and Google Scholar to collect sufficient articles relevant to our subject. Data were extracted and analyzed from selected studies including study type, sample size and characteristics, duration of the observation after removal wisdom teeth, the questionnaire used for evaluation of this QoL and, the result.

Results: Of 107 studies, fourteen representing 4990 cases met the inclusion criteria. The quality of life has deteriorated but different factors contributed to his improvement. Thus, different instruments have been used in these studies: 24 the OHIP-14, 10 the OHQoLUK, 8 the HRQOL, 2 the EQ-5D-3L QOL, and 1 used UW-QOL.

Conclusion: The extraction of mandibular wisdom teeth has a negative effect on the quality of life during the first postoperative days but improved progressively by following the medical instructions given by the dental surgeon.

1. Introduction

The extraction of mandibular wisdom teeth represents the most frequent surgical procedure performed in oral surgery with a percentage of 5 million per year in the United States [1–4,8,14,16]. Different complications are frequently encountered in the majority of the population in the first few days following this extraction such as: osteitis, alveolitis, pain, trismus, edema as well as a difficulty of swallowing [2,3,10,16]. Thus, it should be noted that these complications might significantly lead to deterioration in the quality of life (QoL) during the immediate postoperative period [1,8,9] (Tables 5 and 6).

Quality of life can be defined as “a state of well-being” which is based on two components. The first is the ability to perform daily activities that reflect physical, psychological, and social well-being and the second is the patient’s satisfaction with the level of functioning, control of disease, and treatment-related symptoms [15,16].

For the assessment of this quality of life, several instruments have been used. We can identify in the study of Shugars et al. [3] the HRQOL, which allows us to appreciate the perception after the surgical extraction of mandibular wisdom tooth according to 4 domains “oral function, general activity, signs and symptoms, pain”. In addition, Matijevic et al. [7] and Braimah et al. [11] used OHIP-14 or OHQoLUK [11] to evaluate the quality of life with positive and negative aspects after this surgery.

This systematic review of the literature aimed to determine the impact of the surgical removal of the third molar on physical, psychological, and social well-being by using different instruments. In addition, to expose the different measures, which contribute to his improvement.

2. Materials and methods

We conducted this review according to the Cochrane Handbook of Systematic Reviews and Interventions, the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) guidelines, and AMSTAR (Assessing the methodological quality of systematic reviews) guidelines [12,13]. It was registered on PROSPERO (ID: CRD42022319556).

2.1. Criteria for considering studies for this review

Types of studies: prospective and retrospective studies, observational and randomized clinical trials.

Types of participants: Patients in good health who underwent surgical extraction of mandibular wisdom teeth.

Types of interventions: Extraction of the mandibular wisdom tooth
in different positions: “horizontal, vertical and mesio or disto-position”.

Types of outcome measures: The main objective was to determine the severity of quality of life impairment after mandibular wisdom teeth extraction by using different types of questionnaires.

The primary outcome: depending on the postoperative days, this QoL differs with a significant deterioration in the 1st days but gradually improves.

The secondary result: Several procedures have been reported in the literature to improve the quality of life of patients after mandibular wisdom teeth extraction.

2.2. Search methods for identification of studies

2.2.1. Selection of studies

To identify studies included in or considered for this review, we developed detailed search strategies for each database searched until September 2021. Based on the search strategy developed for MEDLINE but revised appropriately for each database. A PICO approach was used in the databases search with MeSH and text words.

The electronic data resources used were “National Library of Medicine, Washington” (MEDLINE-PubMed); the Cochrane Central Register of Controlled Trials (CENTRAL); (CINAHL-EBSCOhost); (ELSEVIER-ScienceDirect), (SCOPUS). The search was limited to human clinical studies and the last electronic search was performed in September 2021. The reference lists of the articles identified were cross-checked for other relevant articles (Table 1).

2.2.2. Data collection and analysis

Two review authors (LH and BC) separately examined the title and abstract of each article identified by the different search strategies. The authors classified relevant studies.

2.2.3. Inclusion and exclusion criteria

Publications written in English and French were included. While those in Arabic language systemic reviews, studies that did not include questionnaires, and those focusing on upper wisdom teeth were excluded.

2.2.4. Data extraction and management

All studies responding to the inclusion criteria underwent data extraction performed by at least two review authors. Both reviewers used a standardized data extraction sheet with the following parameters: study type, questionnaire quality of life, treatment in the control or placebo group, the total number of patients, and the total duration of observation.

We present the characteristics of trial participants, interventions, and outcomes for the trials in the Characteristics of included studies.

3. Results

3.1. Study selection

A total of 107 studies were identified. Of this, 13 duplicate articles were excluded, which resulted in 94 articles for analysis. After selected titles and abstracts according to the eligibility criteria required for our study, 74 full-text articles remained, of which 20 were excluded at this stage. Finally, 40 articles comprising 4990 patients were selected for inclusion in our work (Table 2).

3.2. Study results

For the evaluation of the quality of life after removal of mandibular
### Table 3
Characteristics of the included studies.

| Authors             | Years | Types of studies                                      | Evaluation criteria | The population                      | Duration of the observation | Questionnaires | The results                                                                                                                                 |
|---------------------|-------|------------------------------------------------------|---------------------|-------------------------------------|-----------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Osagie O et al [4]  | 2021  | Prospective randomized study                        | Clinics             | 50 patients aged between 18 and 35 years | 1, 3, and 7 days            | OHQoL-UK       | Postoperative application of PRF “platelet-rich fibrin” at the extraction site of the impacted lower wisdom tooth has a positive impact on oral health related quality of life. In relation to the effect of PRF - platelet-rich plasma according to this study there was no significant difference with PRF. |
| Xie L et al [5]     | 2021  | Randomized, Double-blind, Placebo-Controlled Clinical Trial | Clinics             | 60 patients aged between 18 and 48 years | 1–7 days                    | UK-OHRQoL      | Preemptive oral etoricoxib (60 mg 30 min before intervention) represent an effective therapeutic approach to improving quality of life following surgical extraction of a lower third molar. |
| Braimah RO et al [6] | 2021  | Prospective study                                   | Clinics             | 78 patients aged between 20 and 49 years | 1, 3, 5, 7 and 14 days      | UK-OHRQoL      | Quality of life was better in the group of patients who received IM co-administration of 8 mg Dexamethasone and 75 mg Diclofenac. Compared to those who just put ice packs extra-orally trans-alveolar after extraction of impacted mandibular third molars. |
| Larsen MK et al [18] | 2021  | Double-blind, split-mouth, randomized controlled trial | Clinics             | 52 patients aged between 18 and 39 years | 1, 3, 7 days and 1 months | OHIP-14        | No significant difference of methylprednisolone or placebo in postoperative sequelae and quality of life after third molar mandibular removal. |
| Lindeboom JA et al [19] | 2021  | Prospective randomized controlled trial           | Clinics             | 87 patients Average age 26.47 years   | 1–7 days                    | OHIP-14        | The insertion of an iodine pad into the postoperative socket decreased pain and impact on oral health-related quality of life in the first postoperative week. |
| Doni B R et al [21] | 2021  | Descriptive cross-sectional study                   | Clinics             | 246 patients Aged between 15 and 58 years | 3 months                   | OHRQoL         | Quality of life after removal of mandibular third molar in asymptomatic patient was better compared to those who were symptomatic. |
| Erdil A et al [20]  | 2020  | Randomized, controlled clinical trial              | Clinics             | 82 patients 2, 7 days                | OHRQoL         | The combination of Kinesio taping with injection of corticosteroids in preoperatively or prescription of anti-inflammatory in postoperative provide results in terms of trismus, edema, and QoL after third molar extraction. |
| Ai Lyn Lau A et al [22] | 2020  | Randomized, controlled, double-blinded trial       | Clinics             | 130 patients Aged between 18 and 65 years | 2, 7 days                  | OHRQoL         | Submucosal administration of dexamethasone has a positive impact on oral health related quality of life and postoperative swelling, pain and trismus after third molar surgery. |
| Tuk GJ et al [23]   | 2019  | Prospective, crossover, randomized controlled study | Clinics             | 54 patients Average age 25.1 years    | 1–7 days                    | OHRQoL         | The administration of an iodine-containing tampon in the socket after the extraction of impacted mandibular third molars has a positive impact on the oral health related quality of life. |
| Beech AN et al [24] | 2018  | Observational study                                 | Clinics             | 30 patients Aged between 18 and 25 years | 1–7 days                  | EQ-5D-3L-QoL   | The use of a home facial cooling system “The Hilotherm” provides an improvement in the quality of life after extraction of the impacted mandibular wisdom tooth. |
| Ibikunle AA et al [25] | 2017  | Observational study                                 | Clinics             | 124 patients Aged between 18 and 51 years | 1–7 days                  | OHRQoL         | The patients’ quality of life was impaired on days 1 and 3 after extraction of the impacted mandibular wisdom tooth, but was significantly improved on day 7 postoperatively. |
| Essen A et al [26]  | 2017  | Retrospective study based on a graph                | Clinics             | 62 patients aged between 18 and 40 years | 1–5 days                  | OHRQoL         | The preoperative prescription of the antibiotic combination Amoxicillin/Clavulanic acid would have the same effect on the quality of life when using amoxicillin alone. |
| Fennis JP et al [27] | 2017  | Randomized controlled trial                         | Clinics             | 280 patients aged under than 26 years old | 1–7 days                  | OHRQoL         | Irrigation of the surgical site with tap water using a curved syringe after extraction of the impacted mandibular wisdom tooth is effective in reducing the risk of inflammatory complications. |
| Braimah RO et al [28] | 2017  | Observational study                                 | Clinics             | 135 patients Aged between 18 et 35 years | 1–7 days                  | UK-OHRQoL      | A pre- and postoperative prescription of amoxicillin 875 mg combined with clavulanic acid 625 mg provides an improvement in quality of life after extraction of the impacted mandibular wisdom tooth. This is in contrast to antibiotic prophylaxis with amoxicillin 875 mg and clavulanic acid 125 mg. |

(continued on next page)
Table 3 (continued)

| Authors                        | Years     | Types of studies          | Evaluation criteria | The population          | Duration of the observation | Questionnaires | The results                                                                                                                                 |
|-------------------------------|-----------|---------------------------|---------------------|-------------------------|-----------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Beech AN et al [29]           | 2017      | Observational study       | Clinics             | 40 patients aged between 18 and 61 years | 1–7 days                    | EQ5D3L         | OHIP-14                                                                                                                      |
| Shenan B et al [41]           | 2012      | Prospective study         | Clinics             | 60 patients aged between 18 and 35 years | 3 months                    | OHIP-14        | Quality of life is negatively affected in patients with minor pericoronitis symptomatology after extraction of impacted mandibular wisdom tooth. |
| Ceib P et al [42]             | 2010      | Prospective study         | Clinics             | 958 patients aged between 14 and 40 years | 1–14 days                   | HRQOL          | Patients younger than 21 years of age recover more quickly and therefore have a better quality of life compared to those who are older. |
| Larrazaabal C et al [43]      | 2010      | Prospective study         | Clinics             | 50 patients aged between 18 and 39 years | 1–7 days                    | OHIP-14        | Patients who did not brush their teeth and who smoked cigarettes pre- and postoperatively had intolerable pain in the first 24 h after extraction of the impacted mandibular wisdom tooth. |
Table 3 (continued)

| Authors            | Years | Types of studies          | Evaluation criteria                  | The population               | Duration of the observation | Questionnaires          | The results                                           |
|--------------------|-------|---------------------------|--------------------------------------|-----------------------------|----------------------------|-------------------------|------------------------------------------------------|
| Sato RF et al [44] | 2009  | Prospective study        | Clinics                              | 128 patients Aged between 16 and 40 years | 1–7 days                  | HRQOL                   | The quality of life of patients after extraction of impacted mandibular wisdom teeth was deficient in the first 3 days postoperatively and which tended to improve with time. |
| Deepti C et al [1] | 2009  | Randomized controlled trial | Clinics                              | 72 patients aged between 18 and 45 years | 1–7 days                  | OHIP-14, OHQoLUK-16    | There was a significant deterioration in quality of life during the first 5 days after extraction of the impacted mandibular wisdom tooth, which improved after the 6th day. The use of these two questionnaires in this study identified that there is no difference between them. |
| Chuang SKEt al [45] | 2007  | Prospective cohort study  | Clinics                              | 4004 patients Aged between 13 et 89 ans | 1–7 days                  | OHIP-14                   | There is an increased risk of complications and deterioration of quality of life in patients over 25 years of age compared to those who were younger. |
| Shugars DA et al [3] | 2006  | Prospective observational study | Clinics                              | 63 patients under than 25 years old | 1–7 days                  | OHIP-14, OHQoLUK       | The use of these two instruments showed significant results in determining quality of life after extraction of the impacted mandibular wisdom tooth. |
| Colorado-Bonnin M et al [46] | 2006  | Objective observational study | Clinics                              | 105 patients average age 25.1 ans | 1–7 days                  | HRQOL-sp                | Women experienced more pain than men, especially in the first 3 days after extraction of the impacted mandibular wisdom tooth. In addition, patients who were followed by telephone and were able to follow the instructions had an improvement in their quality of life postoperatively. |
| Stavropoulos MF et al [47] | 2006  | Prospective study        | Clinics                              | 63 patients Aged between 18 and 25 years | 1–14 days                 | HRQOL                   | Topical application of Minocycline or Ampicillin improves the quality of life after extraction of the impacted mandibular wisdom tooth. |
| White RP et al [48] | 2003  | Observational study      | Clinics                              | 740 patients Aged between 14 and 40 years | 1–14 days                 | HRQOL                   | After extraction of the impacted mandibular wisdom tooth, most patients reported pain, swelling and deterioration of their quality of life. But this tended to decrease until it disappeared over time. |
| Colman MC et al [49] | 2003  | Prospective observational study | Clinics                              | 100 patients under than 26 years old | 1–7 days                  | OHIP-14, OHQoLUK       | The OHIP-14 instrument was more reliable and significant in measuring quality of life after extraction of the impacted mandibular wisdom tooth. This was explained by the significant difference in scores and much more severe changes in the level of perception. |

Table 3 (continued)

| Authors            | Years | Types of studies          | Evaluation criteria                  | The population               | Duration of the observation | Questionnaires          | The results                                           |
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4. Discussion

The extraction of the impacted mandibular wisdom tooth creates an alteration in the quality of life in the patients postoperatively. This notion of quality of life includes several distinct parameters that describe more precisely the perception of the patient in front of this extraction while taking into account their worries, expectations, and several factors that improve or deteriorate their postoperative period. In relation to the functional limitation: Deepti C et al. [1], Aravena P et al. [2] as well as Shugars DA et al. [3], have represented this after the extraction of the mandibular wisdom teeth by several components. These include difficulty in working, performing sports and leisure activities, discomfort in opening the mouth, which may worsen with the installation of trismus, and difficulties in pronouncing words.

Regarding pain, several authors in particular Xie L et al. [5], Braimah RO et al. [6], Lindeboom JA et al. [19], and Ai Lyn Lau A et al. [22] have discussed the value of preoperative prescription of anti-inflammatory drugs or the use of an iodine tampon in the postoperativeocket for pain reduction. We also distinguish the physical disorder represented by alteration in the quality of life in patients postoperatively. This was explained by the significant difference in scores and much more severe changes in the level of perception.
Table 4

Appraisal tool for Cross-Sectional Studies (AXIS) [30].

| Domain                                      | Doni B R et al. [21] | YES | NOT | Do not know/ comment |
|---------------------------------------------|----------------------|-----|-----|-----------------------|
| Introduction                                |                      |     |     |                       |
| 1 Were the aims/objectives of the study clear? | +                    |     |     |                       |
| Methods                                     |                      |     |     |                       |
| 2 Was the study design appropriate for the stated aim(s)? | +                  |     |     |                       |
| 3 Was the sample size justified?            |                      |     |     |                       |
| 4 Was the target/reference population clearly defined? (Is it clear who the research was about?) | +                  |     |     |                       |
| 5 Was the sample frame taken from an appropriate population base so that it closely represented the target/reference population under investigation? | +                  |     |     |                       |
| 6 Was the selection process likely to select subjects/participants that were representative of the target/reference population under investigation? | +                  |     |     |                       |
| 7 Were measures undertaken to address and categorise non-responders? | +                  |     |     |                       |
| 8 Were the risk factor and outcome variables measured appropriate to the aims of the study? | +                  |     |     |                       |
| 9 Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or published previously? | +                  |     |     |                       |
| 10 Is it clear what was used to determined statistical significance and/or precision estimates? (eg, p values, CIs) | +                  |     |     |                       |
| 11 Were the methods (including statistical methods) sufficiently described to enable them to be repeated? | +                  |     |     |                       |
| Results                                     |                      |     |     |                       |
| 12 Were the basic data adequately described? | +                    |     |     |                       |
| 13 Does the response rate raise concerns about non-response bias? | +                  |     |     |                       |
| 14 If appropriate, was information about non-responders described? | +                  |     |     |                       |
| 15 Were the results internally consistent? | +                    |     |     |                       |
| 16 Were the results for the analyses described in the methods, presented? | +                  |     |     |                       |
| Discussion                                  |                      |     |     |                       |
| 17 Were the authors’ discussions and conclusions justified by the results? | +                  |     |     |                       |
| 18 Were the limitations of the study discussed? | +                  |     |     |                       |
| Other                                       |                      |     |     |                       |
| 19 Were there any funding sources or conflicts of interest that may affect the authors’ interpretation of the results? | +                  |     |     |                       |
| 20 Was ethical approval or consent of participants attained? | +               |     |     |                       |

Regarding the scoring systems, the higher scores of OHIP-14, and HRQOL was correlated with a negative impact on quality of life, especially from day 1 to day 7 postoperatively.

This finding could be explained by the difficulty of the operation involving osteotomy, separation, and incision as well as possible complications such as trismus, edema, and pain associated with surgical removal of the mandibular third molar [25,31,48].

Currently, when the impact of this extraction on quality of life was analyzed separately for each domain, the domain “physical pain” was mostly recorded by patients (91%) [1,6,22,43].

The present results reveal that pain seems to be the main reason for the deterioration of quality of life after this extraction, mainly on the 1st postoperative day [11,48], and decreasing linearly during the follow-up. These results may provide a source of information for clinical planning when considering prescribing analgesics for faster patient recovery.

Many therapies have been proposed by several authors whose goal is to control postoperative pain and ensure a better quality of life such as:

Table 5

Revised Cochrane risk-of-bias tool for randomized trials (RoB 2) [31].

| Study                                      | Risk of Bias Domains |
|--------------------------------------------|----------------------|
|                                            | D1  | D2  | D3  | D4  | D5  | Overall |
| Xie L et al [5] 2021                        | -   | +   | X   | +   | +   | X       |
| Larsen MK et al [18] 2021                  | +   | -   | -   | +   | +   | -       |
| Lindeboom JA et al [19] 2021               | +   | +   | +   | +   | +   | +       |
| Erdil A et al [20] 2020                    | -   | +   | +   | +   | +   | -       |
| Ai Lyn Lau A et al [22] 2020               | +   | +   | +   | +   | +   | +       |
| Fennis JP et al [27] 2017                  | +   | +   | +   | +   | +   | +       |
| Ibikunle AA et al [32] 2016                | +   | +   | +   | +   | +   | +       |
| Rodanant P et al [33] 2016                 | -   | +   | +   | +   | +   | +       |
| Sierra SO et al [38] 2013                  | +   | +   | +   | +   | +   | +       |
| Deepti C et al [1] 2009                    | -   | X   | -   | +   | +   | X       |

Domains: Judgement:

D1: Bias arising from the randomization process
X D2: Bias due to deviations from intended intervention High
D3: Bias due to missing outcome data Some concerns +
D4: Bias in measurement of the outcome Low
D5: Bias in selection of the reported result

“aPDT laser [35], also the low-powered one (LLLT) [39]”, ozone therapy [37] and/or hilotherapy [25]. Medication in the form of “intravenous injection of prednisolone [18] and submucosal dexamethasone [5] or even Bromelain [36] etc.

5. Conclusion

In summary, many studies have been conducted on the extraction of impacted mandibular wisdom teeth, and more specifically those evaluating the clinical quality of life after this extraction. Thus, the difference between these studies, notably the sample size, the protocols of realization, the duration of the study, and the criteria of judgment, allows a more precise exploration of this quality of life in all these parameters.

In the present work, a synthetic conclusion can be formulated: the extraction of impacted mandibular wisdom teeth has a negative effect on the quality of life during the first postoperative days but improves progressively by following good postoperative instructions.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Compliance with ethical standards

This research involved human participants. This was a retrospective analysis of published cases and did not require informed consent. Ethics approval and consent to participate were not included in this review.

Ethical approval

Not applicable (Systematic Review).
Table 6
Risk of bias for included studies: NIH Quality Assessment Tool for Observational Cohort studies [52].

| NIH Quality Assessment Tool | References of the articles |
|-----------------------------|---------------------------|
| 2                           | 3 4 6 7 17 21 23 24 25 26 28 29 30 31 34 35 36 37 39 40 41 42 43 44 45 46 47 48 49 |
| 1 Was the research question or objective in this paper clearly stated? | Y Y Y Y V V Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y 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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.amsu.2022.104387.

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