ZZQ

AGENCY FOR QUALITY
IN DENTISTRY
a unit of the Institute of
German Dentists

GUIDELINE

SUBJECT **Surgical removal of third molars**

Short version April 2006

WHAT ARE GUIDELINES?

Guidelines are systematically developed aids to decision-making concerning the medical or dental procedures appropriate for preventive measures and specific health problems. They constitute a consensus among a number of experts from various disciplines and/or working groups arrived at by a defined process that has been made as transparent as possible. Rather than rigidly prescribed directives, they are guides, or “corridors for action and decision”, for the safeguarding and improvement of healthcare, as well as instruments of quality assurance and quality management. They are intended to minimize the risks of treatment and to provide the motivation for a scientifically based medical approach, while at the same time taking account of patient needs and attitudes. Guidelines are drawn up in accordance with the latest state of medical knowledge without regard to the current extent of benefits offered by individual insurance systems.

Another function of guidelines is to evaluate the current status of knowledge in relation to specific health problems and medical action. They also serve for resolving conflicting views and for weighing the advantages of a given procedure against the risk of harm. In addition, a guideline should specify its aims, the significance of the health problem in question and the relevant target group.

The systematic gathering and collation of the available literature for the compilation of a guideline takes due account of the current levels of published (scientifically validated) evidence.

Finally, guidelines serve to answer the following questions: What is necessary and reasonable? What is superfluous? What is obsolete?

CLASSIFICATION OF EVIDENCE LEVELS (FROM AWMF 2001, MODIFIED)

CRITERION	TYPE OF EVIDENCE
A	Evidence based on meta-analyses of randomized controlled studies Evidence based on one randomized controlled study
B1	Evidence based on at least one well-designed controlled study without randomization Evidence based on at least one well-designed quasi-experimental study
B2	Evidence based on well-designed non-experimental descriptive studies (e.g. cross-sectional studies)
C	Evidence based on reports or opinions of groups of experts, consensus conferences and/or clinical experience of recognized authorities; case studies

A classification by recommendation levels is arrived at on the basis of the above criteria by a consensual process involving all parties concerned; account must also be taken of such considerations as patient preferences, clinical relevance and feasibility of application in the routine medical situation. The recommendation levels are:

A Strong recommendation **B** Recommendation **O** Recommendation open

Surgical removal of third molars

1. INTRODUCTION

1.1 Reasons for attribution of priority

The compilation of a guideline for the treatment of third molars has become a matter of priority for the following reasons:

- Prevalence of the clinical problem
- Frequency of the operation
- Frequency of complications
- Therapeutic uncertainty
- Significance in terms of health economics owing to the cost of removal

1.2 Users of the Guideline

Dentists in general, dentists specializing in oral surgery and doctors – in particular, those specializing in oral and maxillofacial surgery.

1.3 Situations not covered by the Guideline

The following are beyond the scope of this Guideline:

- Prophylactic tooth extractions for higher-level medical reasons (e.g. radiotherapy, chemotherapy, immunosuppression or focal diseases); a general recommendation is not feasible in these cases owing to the variability and complexity of the medical issues.
- Retained teeth other than third molars.

1.4 Special cases covered by the Guideline

- Third molars exhibiting manifest associated pathology (e.g. cysts or tumours)
- Third molars in a fracture gap

- Third molars potentially impeding osteotomy in planned jaw realignment

2. DEFINITIONS

The term “retention” denotes a position of a third molar in which the occlusal plane is not reached on completion of root growth. A tooth of which parts of the crown reach the oral cavity or are connected with the oral cavity via the periodontal apparatus of the adjacent second molar is said to be partially retained. Teeth wholly lacking a connection with the oral cavity are described as fully retained. The term “impaction” refers to a tooth that has remained fully embedded in the bone. A tooth is said to be malposed if its axis or position deviates from the normal direction of eruption.

3. AIMS OF THE GUIDELINE

This Guideline is intended to assist the professional groups mentioned above with the differential therapeutic decision on whether to remove or not to remove third molars and with the identification of patients likely to benefit from their removal or non-removal respectively. Another aim to prevent the occurrence of pathological processes associated with retained third molars. The overriding aim of the Guideline is thus to improve the quality of care for the relevant group of patients by the avoidance of complications due to:

a) non-removal of teeth where removal is indicated;
b) removal of teeth where removal is not indicated.

4. SYMPTOMS

Some typical clinical and radiological symptoms of third molar pathology are as follows:

- Pericoronal infection
- Extension of pericoronal space as revealed by radiology
- Pericoronal swelling (e.g. due to a cyst)

- Maxillofacial pain and/or tension
- Pocketing and bone resorption distally from the second molar
- Resorption of adjacent teeth
- Elongation or inclination

5. EXAMINATIONS

5.1 Examinations required for decision on treatment

- General and specific history
- Inspection; also palpation where appropriate
- Radiological examination showing the complete tooth as well as the relevant surrounding anatomical structures

5.2 Additional examinations helpful in specific cases

- Vitality testing of adjacent teeth
- Sensitivity testing (lingual and mental nerves)
- Measurement of periodontal parameters (pocket depth)
- Further X-ray from a different angle
- Computer tomography or digital volume tomography where the tooth's position is critical in relation to the surrounding structure – in particular, to the inferior alveolar nerve
- Biopsy in the case of pathological changes
- Chemical laboratory tests (e.g. of clotting parameters) in the event of concomitant conditions
- Assessment of the orthodontic, functional, prosthetic and restorative situation

6. TREATMENT

6.1 Restorative treatment

- Local antiseptic measures in the case of acute inflammations

- Antibiotic treatment of acute infections with a tendency to spread

6.2 Surgical treatment

- Incision and drainage
- Surgical exposure
- Surgical periodontal treatment
- Surgical removal
- Transplant

6.3 Supplementary measures

- Orthodontic alignment
- Utilization for prosthetic purposes

7. RISK FACTORS

7.1 Local risk factors with the potential to present difficulty in tooth removal

The following situations may give rise to an increased risk of complications from tooth removal:

- Existing acute or chronic infection
- Root anomalies
- Crowding of adjacent teeth
- Projection of mandibular channel nerve pathway on to parts of the retained tooth
- Tooth ankylosis
- Ectopic position of third molar
- Prior jawbone radiotherapy
- Severe comorbidities in the patient

7.2 Local risk factors in the case of non-removal

The following situations may give rise to an increased risk of complications in the event of non-removal:

- Past pericoronitis
- Extension of pericoronal space
- Resorption of adjacent teeth
- Carious defects or periodontal lesions in third molar or adjacent tooth
- Partial retention
- Partial surgical exposure of third molar to permit possible further eruption
- Tooth under tissue-borne prosthesis

8. COMPLICATIONS

Although the clinical relevance of the complications set out below is supported by a large number of publications, scientifically verified frequency data of proven epidemiological validity based on prospective studies are not yet available.

8.1 Complications of removal of third molars

- Damage to sensitive trigeminal rami
- Post-operative infection
- Injury to adjacent second molar
- Jaw fracture
- Perioperative haemorrhage
- Anaesthesia-related complications
- Post-operative swelling and pain

8.2 Complications of non-removal of third molars

- Pericoronitis-related infections
- Resorption of adjacent second molar roots

- Periodontal damage to adjacent second molar
- Carious defects in third molar or adjacent tooth
- Odontogenic cyst formation
- Neoplasia formation
- Risk of jaw fracture
- Disturbance of dynamic occlusion (elongation or inclination), sometimes accompanied by facial pain

9. RECOMMENDATIONS

9.1 Recommendations concerning indications for treatment

For a decision on whether treatment is appropriate, a distinction must be made between clinically and/or radiologically symptomatic teeth and clinically and/or radiologically asymptomatic teeth (evidence level C). Whereas the removal of clinically or radiologically symptomatic teeth is almost universally advocated in the literature, there is little scientific evidence for a general recommendation on the removal of asymptomatic third molars (evidence level C). In particular, there is as yet a dearth of prospective randomized comparative studies of the frequencies of relevant complications of removal and those of non-removal of asymptomatic third molars extending over adequate periods of time. A study of this issue by the American Association of Oral and Maxillofacial Surgeons (AAOMS) is currently in progress.

Studies of geographically isolated populations using methodology that permits conclusions as to the frequency of complications in the population as a whole at present suggest that infectious complications calling for inpatient treatment result more frequently from the removal than from the non-removal of third molars (evidence level B2).

Longitudinal studies show that some 30% of third molars recommended for removal at about age 18 position themselves correctly in the dental arch by age 30 (evidence level B2). On the other hand, the older the patient, the more frequently surgical removal is found to give rise to

complications (e.g. reduced regeneration of the periodontium and increased risk of mandibular fracture).

One prospective randomized study failed to demonstrate any advantage of third molar removal in preventing tertiary crowding of the mandibular anterior teeth after orthodontic treatment, although significantly greater shortening of the anterior dental arch was observed when the third molars were left in place (evidence level B1). Since over 50% of the patients in this study had undergone prior removal of premolars, however, the results cannot be transposed to patients with complete dentition.

The following recommendations can therefore be made concerning the removal of retained third molars:

9.1.1 Indications for removal of third molars

Removal is indicated in the following cases:

a) Acute or chronic infection (acute pericoronitis) **A**
b) Exposed pulp due to caries **A**
c) Non-restorable caries-damaged teeth or untreatable pulpitis **A**
d) If it appears that the third molar is a significant source of pain **B**
e) Untreatable periapical changes **A**
f) Manifest pathological structures associated with dental follicles (e.g. cysts or a tumour) or suspicion of such changes **A**
g) Resorption of adjacent teeth **A**
h) In connection with the treatment of periodontal disease or limitation of its progression **A**
i) Teeth that impede orthodontic and reconstructive surgery **B**
j) Teeth in the fracture gap that impede fracture treatment **B**
k) Where the tooth is to be used for transplant purposes **A**
l) If the elongated or inclined third molar presents a manifest disturbance of dynamic occlusion **B**

9.1.2 Indications for the removal of clinically and radiologically asymptomatic third molars having regard to the local risks of surgery

Removal may be indicated in the following cases:

a) Prophylactic removal for higher-level reasons associated with the patient's life situation (e.g. non-availability of medical care) **B**
b) If other measures are being conducted under anaesthetic and further anaesthesia would be necessary for removal of a third molar **B**
c) Where prosthetic treatment is planned and secondary eruption due to further atrophy of the alveolar ridge or to pressure of the removable prosthesis is likely **B**
d) To facilitate orthodontic treatment such as tooth movement and/or retention **B**

9.1.3 Indications for non-removal of clinically and radiologically asymptomatic third molars

Removal is not indicated in the following cases:

a) Where spontaneous regular positioning of the third molars in the dental arch is likely **A**
b) If the extraction of other teeth and/or orthodontic treatment with correct positioning of the tooth is appropriate **A**
c) Deeply impacted and malposed teeth without associated pathology, where a high risk of surgical complications exists **B**

9.2 Recommendations on the conduct of surgical measures

9.2.1 Outpatient/inpatient treatment; anaesthesia

Outpatient treatment is as a rule sufficient. Teeth can be removed quadrant by quadrant, or several or all third molars can be removed in a single session. **B**

Anaesthesia or sedation may be indicated where problems of patient co-operation are anticipated, in the case of large-scale dentoalveolar interventions or of manifest local risk factors (see Section 7.1), or at the patient's explicit request. **A**

Examples of situations where inpatient treatment may be indicated are severe systemic disorders or exceptional surgical configurations. **B**

9.2.2 Conduct of tooth removal

All parts of a tooth should normally be removed. **A**

In individual cases the non-removal of minimal parts of non-inflamed teeth may be justified for the avoidance of serious iatrogenic complications (e.g. nerve lesions or disproportionate bone damage). The advantages must be weighed against the disadvantages. **O**

9.2.3 Adjuvant therapy

The scientific evidence for perioperative antiseptic or antibiotic prophylaxis is inconsistent. A general recommendation cannot therefore be given. **B**

Antipyretic prophylaxis is effective in reducing post-operative swelling, but is not always necessary. **B**

9.2.4 Specific surgical configurations and diagnostic constellations

For specific situations (comorbidities such as heart valve replacement), reference should be made to the relevant guidelines or links (see also Section 11 of this Guideline).

10. REFERENCES

The following is a selection from the literature:

Gülicher, D., Gerlach, K.L., Inzidenz, Risikofaktoren und Verlauf von Sensibilitätsstörungen nach operativer Weisheitszahnentfernung. Mund Kiefer GesichtsChir, 4, 99–104 (2000).

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SIGN, Management of unerupted and impacted third molar teeth. SIGN Publication, 43 (2000).

Song, F., O'Meara, S., Wilson, P., Golder, S., Kleijnen, J., The effectiveness and cost-effectiveness of prophylactic removal of wisdom teeth. Health Technol Assess, 4, 1–15 (2000).

Strietzel, F.P., Reichart, P.A., Wundheilung nach operativer Weisheitszahnentfernung. Mund Kiefer GesichtsChir, 74–84 (2002).

Worrall, S.F., Riden, K., Haskell, R. Corrigan, A.M., UK national third molar project: the initial report. Br J Oral Maxillofac Surg, 36, 14-18 (1998).

11. LINKS

Relevant scientific Opinions of the DGZMK [German Society of Dental, Oral and Craniomandibular Sciences] (in German only):

Indikationen zur operativen Weisheitszahnentfernung
(http://www.DGZMK.de/stellung/Weisheitszahnextraktion.pdf)

Indikation zur Entfernung der Weisheitszahnkeime aus kieferorthopädischer Sicht unter besonderer Berücksichtigung der Prophylaxe eines tertiären Engstandes
(http://www.dgkfo.de/stellung9.html)

12. WHERE TO FIND FURTHER INFORMATION

The complete Guideline (in German) on the surgical removal of third molars, based on the systematic evaluation of the relevant medical literature and two expert conferences, together with a list of references, can be found on the home page of the Agency for Quality in Dentistry:

www.zzq-koeln.de under **Schwerpunkte/Leitlinien**

13. UPDATE RECOMMENDATIONS

This Guideline will be updated in 2010.

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15. SCIENTIFIC AND PROFESSIONAL ASSOCIATIONS INVOLVED IN FORMAL CONSENSUS TECHNIQUES:

Deutsche Gesellschaft für Mund-, Kiefer-, Gesichtschirurgie (DGMKG)
Deutsche Gesellschaft für Zahn-, Mund- und Kieferheilkunde (DGZMK)
Deutsche Gesellschaft für Zahnerhaltung (DGZ)
Deutsche Gesellschaft für Kieferorthopädie (DGKfO)
Deutsche Gesellschaft für Zahnärztliche Prothetik und Werkstoffkunde e.V. (DGZPW)
Bundeszahnärztekammer (BZÄK)
Kassenzahnärztliche Bundesvereinigung (KZBV)

Bundesverband Deutscher Oralchirurgen (BDO)

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