

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

GUIDELINE

Pit and Fissure sealing

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What are Guidelines?

Guidelines are systematically developed aids to decision-making concerning the medical or dental procedures appropriate for therapeutic 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 general 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 medical knowledge without regard to the current extent of benefits offered by individual insurance systems.

Another function of a guideline 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 What is obsolete?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
I	Evidence based on meta-analyses of randomized controlled trials Evidence based on one randomized controlled trial
II	Evidence based on at least one well-designed controlled study without randomization Evidence based on at least one well-designed quasi-experimental study
III	Evidence based on well-designed non-experimental descriptive studies (e.g. cross-sectional studies)
IV	Evidence based on reports/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 or feasibility of application in the routine medical situation. The recommendation levels are:

- A Strong recommendation
- B Recommendation
- O Recommendation open

1 Definition, scope and purpose of the “Pit and Fissure Sealing” Guideline

Sealing is defined as the preventive seal of caries-susceptible pits and fissures in order to prevent or arrest the development of dental caries (Welbury et al. 2004). In this context, pit and fissure sealing (FS) is a preventive measure specific to these tooth surfaces (Figure 1). In addition to sealing caries-susceptible pits and fissures, the following recommendations are given for comprehensive preventive care:

- appropriate fluoride supplement
- adequate domestic oral hygiene
- tooth-friendly nutrition and
- ongoing preventive measures related to the caries risk



Figure 1: First permanent molar before and after application of pit and fissure sealing

The target group for this Guideline is, firstly, dentists and, secondly, dental professionals, patients, health insurance funds and health insurers. Patients are primarily children and adolescents as they benefit most from this preventive measure immediately after the permanent molars have erupted.

The aim of this Guideline is to give scientifically based diagnostic and therapeutic recommendations in the field of pit and fissure sealing. It was formulated with its focus on clinical application.

2 Literature search

To compile this “Pit and Fissure Sealing” Guideline, the available scientific literature was systematically screened using the MEDLINE, EMBASE and Cochrane Central Register of Controlled Trials (CENTRAL) databases. The search terms “fiss*” and “seal*” were used. In addition, a manual search of German-language literature was carried out as the majority of this is not listed in English-language databases. At each stage, the literature references were first screened by abstract to ascertain the content relevance of each individual publication. At this stage, non-relevant literature references were identified and excluded. The full text of all literature references with (possible) content relevance was then searched or ordered. Only publications that were available in full text were included in the compilation of the guideline. Studies were excluded if only an abstract was available.

As part of the first regular revision of this Guideline, the literature search was repeated for the years 2004 to 2008 in accordance with the above-mentioned criteria. See the full version for more information on the literature search.

3 Frequency and quality of pit and fissure sealing in the Federal Republic of Germany

In the Federal Republic of Germany, it has been possible since 1993 to invoice pit and fissure sealing of permanent molars for all 6-17 year olds as an IP-5 item under statutory dental health benefits; it is therefore available free of charge to all children and adolescents. With the introduction of this preventive measure the frequency of sealed molars increased markedly.

Accompanying the increasing uptake and acceptance of this caries-preventive measure, various epidemiological cross-sectional studies have revealed quality deficits in pit and fissure sealing that cannot be ignored. Moreover, there are reports that far fewer children from a socially-disadvantaged and/or immigrant background have pit and fissure sealing.

4 Consensus statements

Based on the full version draft guideline, the following statements have been agreed by the scientific and professional associations involved (see under 7) and describe the current status of knowledge in pit and fissure sealing for prevention of occlusal caries.

Statement 1: Pit and fissure sealing is an effective, surface-specific preventive measure for permanent teeth, which has its greatest benefit in children and adolescents. The aim is the remodelling of a plaque-retaining fissure relief into a smooth surface capable of prophylaxis.

Recommendation level: A

Statement 2: FS should be deemed to be indicated only after caries diagnostic examination. FS is indicated in sound, plaque-retaining pits and fissures that are at caries risk from and in pits and fissures with non-cavitated caries lesions.

Recommendation level: B

Occlusal dentine lesions should be excavated and restored by minimally invasive filling procedures.

Recommendation level: A

Statement 3: Priority should be given to early FS in high caries¹ risk patients

Recommendation level: A

Statement 4: Pit and fissure sealing is contraindicated in extended occlusal dentine lesions and on deciduous molars just before physiological exfoliation.

Recommendation level: A

Statement 5: Low-viscous methacrylate-based sealant materials, such as for example autopolymerizing and (fluoride-releasing) light-polymerizing materials are recommended for clinical use as they have a greater effect strength and, compared to glass ionomer cements, higher retention rates. Since (fluoride-releasing) light-polymerizing materials, being single-component materials, are quicker and simpler to apply than autopolymerizing materials, the former should be preferred in routine clinical situations. Glass ionomer cements and compomers are relatively unsuitable for FS on account of their high retention losses.

Recommendation level A

Statement 6: Although comparative clinical studies between absolute moisture control by rubber dam versus relative moisture control with cotton rolls showed a trend in more favourable retention rates for sealants applied using the former, the majority of all comparative studies revealed no significant differences. Relative moisture control can be regarded as sufficient; however, four-handed clinical procedure is essential in this case.

Recommendation level B

Statement 7: It is recommended in FS that fissures are first cleaned with a rotating brush or air flow device. This should be followed by conditioning of the unprepared enamel surface with approximately 35% phosphoric acid for about 60 seconds in the case of permanent dentition (about 120 seconds on deciduous teeth). A chalky-white enamel surface should be visible after thorough removal of the etching agent by spraying with water for at least 10 seconds and forced air drying.

Recommendation level A

¹ A high risk of caries for children and adolescents is based on the definition of the American Dental Association (1995) assessed as:

Experience of caries

- ≥ 2 carious lesions during the last year (filled or with enamel lesions: white spot/brown spot)
- previous flat surface caries

and additionally as:

- deep pits and fissures
- no/hardly any systemic or local fluoride use
- poor oral hygiene
- frequent sugary snacks
- irregular visits to the dentist
- too little saliva flow
- bottle-feeding or breastfeeding babies for too long (infants)

Statement 8: The sealant should then be placed carefully within the fissure relief. Excess material that can lead to occlusal precontacts and a partial or total loss of retention must be avoided. Polymerization lamps of sufficient intensity should be used for light curing. The polymerization time varies with the light intensity and the sealant material and should take 20 to 40 seconds. Occlusion must be verified after sealant application; interfering excesses must be corrected.

Recommendation level A

Statement 9: The pit and fissure sealing should be polished to remove the superficial surface oxygen inhibitor layer. It is recommended that a topical fluoride agent is applied locally to remineralize etched but unsealed areas of enamel.

Recommendation level A

Statement 10: The applied FS should undergo initial re-examination within 6 months. All subsequent recall intervals should be based on the risk of caries.

Recommendation level B

Statement 11: Resealing is indicated in the event of loss of retention.

Recommendation level A

5. UPDATE RECOMMENDATIONS

This Guideline will be updated in 2014.

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7. SCIENTIFIC AND PROFESSIONAL ASSOCIATIONS INVOLVED IN FORMAL CONSENSUS TECHNIQUES

Deutsche Gesellschaft für Zahn-, Mund und Kieferheilkunde (DGZMK) [**German Society for Dental, Oral and Craniomandibular Sciences**]

Deutsche Gesellschaft für Zahnerhaltung (DGZ) [**German Society for Conservative Dentistry**]

Deutsche Gesellschaft für Kinderzahnheilkunde (DGK) [**German Association of Paediatric Dentistry**]

Bundeszahnärztekammer (BZÄK) [**German Dental Association**]

Kassenzahnärztliche Bundesvereinigung (KZBV) [**National Association of Statutory Health Insurance Dentists**]

Deutsche Arbeitsgemeinschaft für Jugendzahnpflege e.V. (DAJ) [**German Working Committee for Dental Care of Youths**]

Bundesverband der Zahnärzte des Öffentlichen Gesundheitsdienstes e.V. (BZÖG)

Deutsche Akademie für Kinderheilkunde und Jugendmedizin e.V. (DAKJ) [**German Academy of Pediatric and Adolescent Medicine**]

Representatives of the Hamburg Quality Circle who tested the guideline under routine conditions

8. REFERENCES

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Mejare I, Lingström P, Petersson LG, Holm AK, Twetman S, Källestal C, Nordenram G, Lagerlöf F, Söder B, Norlund A, Axelsson S, Dahlgren H: Caries-preventive effect of fissure sealants: a systematic review. Acta Odontol Scand 61(2003)321-330.

Welbury R, Raadal M, Lygidakis NA: EAPD guidelines for the use of pit and fissure sealants. Eur J Paediatr Dent 5(2004)179-184.

9. WHERE TO FIND FURTHER INFORMATION?

The complete Guideline (in German) on fissure sealing, based on the systematic evaluation of the literature and formal consensus techniques, together with a list of references, can be found on the home page of the Agency for Quality in Dentistry:

www.zzq-koeln.de/leit.htm