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On behalf of Working
Group 3*

Function

Consensus report of Working Group 3

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Abstract: The method used by the working group was an iterative process based upon a structured review of the relevant literature by the four author groups. Review papers were circulated to the members of the group before the conference and formed the basis for subsequent discussions. Each paper was subject to detailed collective analysis and subsequently modified on the basis of the panel's discussions and referenced to additional relevant literature where appropriate. The group assessed the levels of evidence for the claims and statements made in the supporting documentation. It was recognized that it was often necessary to adopt a compromise between acceptance of the lowest level, resulting in the largest body of material, and the highest level, which in some cases, produced little evidence. While this approach does not represent endorsement of lower evidence levels *per se*, it was designed to provide conclusions of clinical utility within the existing knowledge base. The papers, following the scrutiny, were amended and approved by the expert group. The consensus report was prepared by the working group after detailed considerations of the five approved papers.

The working group was charged with evaluating the available evidence for dimensions of stomatognathic function that influence outcome of prosthetic therapy. Some of these factors were elucidated in five systematic reviews.

All reviews addressed clearly focused issues, i.e., (i) How do patients perceive benefit from reconstructive dentistry (Oral health-related quality of life)? (ii) What is the basis for occlusal designs in tooth, denture and implant borne reconstructions? (iii) In patients with temporomandibular disorders, do particular interventions influence oral health-related quality of life? Is there a superiority of multimodal as opposed to simple therapy in patients with temporomandibular disorders? and (iv) What is the treatment concept for severe tooth attrition?

All author teams reported difficulties in conducting quantitative reviews on these topics for reasons beyond identification difficulties and accessibility to full text

papers. The most common problem was the heterogeneity of treatments and management as well as lack of crucial details on how to differentiate between interventions. Moreover, it was recognized that several recommendations from the reviews, as well as this consensus report, are based on less than ideal levels of evidence.

The use of bibliographic databases varied markedly amongst the five author groups. Medline was the most commonly used database and all five author groups had used this resource. One author group reported using only Medline, while another combined Medline with searches on the Premedline, the Cochrane Library and the ISI Web of Science. Checks from the reference lists were also not consistently reported being used. Resources for non-English literature were not searched, e.g. Embase (European, non-English titles) and Bireme (Spanish and Portuguese). The expert group members agreed that the sys-

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tematic reviews were reasonably complete and accurately reflected the current literature on the topics.

How do patients perceive the benefit of reconstructive dentistry (oral health-related quality of life)? (Thomason et al.)

The present investigation (Thomason et al. 2007) examined patient perception of rehabilitation across the broad spectrum of reconstructive dentistry. Relatively few prosthodontics methodologies have been extensively tested for quality of life or satisfaction outcomes, except for implant-supported dental prostheses treatment compared with conventional dental prostheses in the edentulous mandible.

- There was little or no quality of life data for fixed conventional prostheses compared with implant supported or removable prostheses; economics of different treatment modalities; perception of aesthetics; therapies avoiding active treatment, e.g., adoption of a shortened dental arch compared with the prosthetic provision. Thus, what benefits patients receive from most prosthodontic treatment is still open to question.
- One of the *a priori* questions for this review was whether patients with severe attrition benefited from a particular intervention in terms of higher oral health-related quality of life remained unanswered. No papers could be identified that address the rehabilitation of patients with severe attrition in terms of quality of life or satisfaction outcome.
- In general, there was limited quality of life data that begins to relate oral health-related quality of life to influence on dietary selection and/or intake. However, it can be stated that:
- Patients with implant-supported overdentures report improved satisfaction with chewing in general and for specific food types than that of patients with conventional complete removable dental prostheses.
- Patients report that rehabilitation with implant-supported overdentures and conventional complete removable den-

tal prostheses leads to improved chewing for specific foods.

- Without tailored dietary advice, successful prosthetic rehabilitation does not necessarily result in a satisfactory diet.
- There may be a relationship between quality of life and/or satisfaction and dietary selection or intake, but no evidence to suggest that it is causal.

The clinical and surrogate outcomes that demonstrate the best correlation to oral health quality of life are for edentulous patients:

- Improvements in patient general satisfaction,
- satisfaction with stability,
- satisfaction with chewing ability,
- satisfaction with comfort,
- satisfaction with speech,
- impact on social and sexual activity.

Future research should be directed at the following:

- Clinical trials to elucidate whether patients with severe attrition benefit from particular interventions in terms of improved oral health-related quality of life.
- Clinical trials to elucidate the effect of prosthetic rehabilitation of partially dentate subjects in terms of quality of life and satisfaction.

Bases for using a particular occlusal design in tooth and implant borne reconstructions and complete dentures (Klineberg et al.)

- In spite of several exhaustive searches in different bibliographic databases, the author team (Klineberg et al. 2007) found no strong evidence to recommend a specific occlusal scheme design to prevent or manage further tooth attrition. For many studies, however, there may be questions whether the outcomes reported in clinical trials are sufficiently specific.
- There was little or no good evidence to recommend a particular occlusal scheme design in oral reconstructions

to influence quality of life outcomes or diet.

- A contemporary understanding of occlusal scheme design needs to acknowledge recent neurophysiology research. These data indicate that functional control of the jaw motor system depends on peripheral and central components that work together in a complex manner for fluent activation and modulation of jaw movements. The mechanisms include, but are not limited to, somatosensory receptor activation in the control of orofacial movements and adaptability of the jaw motor system for functional requirements associated with neuroplasticity. For many clinicians, this should represent a major paradigm shift in therapeutical approaches.
- This new paradigm is consistent with the concept that relatively minor changes, such as variations in occlusal scheme design, are accommodated by the neuroplasticity of the jaw motor control system. It provides a basis for the observation that different occlusal scheme designs (anterior guidance vs. group function, cusp-fossa vs. tripodised contacts, point centric vs. long centric, centric relation tooth contact vs. intercuspal position, etc.), sometimes enthusiastically promoted by some clinicians, are equally effective in optimising function. Further, and of equal importance, there was no neurophysiological evidence that any particular occlusal design is 'better' than any other, and the nervous system of individuals appears remarkably adaptable or plastic to the variations placed on it by changes associated with dental treatment.
- The underlying neurophysiological plasticity and multivariate psycho-social behaviour provide an environment for optimistic treatment outcomes as the peripheral and central neural plasticity allow functional adaptation to a changed oral status.

Future research should be directed at the following:

- Identify in human studies evidence of adaptability as a result of neuroplasticity in the central nervous system sec-

ondary to variations in occlusal scheme design.

In patients with temporomandibular disorders, do particular interventions influence oral health-related quality of life? (Türp et al.)

The use of patient-based outcomes to measure therapeutic effectiveness is increasing, because a growing number of clinical scientists attempt to evaluate the impact of therapy from the patients' perspective. There are numerous indications that patients suffering from temporomandibular disorders (TMDs) may also show a reduced oral health-related quality of life. The present investigation (Türp et al. 2007a) focused on the question if therapeutic interventions in TMD patients had a positive effect on their oral health quality of life.

The systematic search of the literature yielded seven relevant contributions. There was a good heterogeneity among the investigations with regard to study design, patient characteristics, and provided therapy. Furthermore, in each of the studies different instruments were used for the assessment of oral health quality of life. The evaluated evidence indicated the following:

- TMDs, particularly its chronic forms, are markedly associated with a reduced oral health quality of life. Pain appears to be a key symptom with regard to a possible impairment of oral health quality of life.
- A major limitation encountered in the identified studies has been the small number of relevant articles: there is an astonishing lack of randomized-controlled studies that give detailed information to which degree therapeutic procedures aiming at relieving TMD symptoms lead to an improvement of patients' oral health quality of life.
- Three articles reported observations from prospective controlled studies. Four additional investigations were retrospective. Among the prospective controlled studies, there was one RCT on the efficacy of the non-steroidal anti-inflammatory drugs naproxen and celecoxib in patients with painful tempor-

omandibular joint disc displacement (Ta & Dionne 2004). According to the results of this investigation, it can be expected that in patients with TMJ arthralgia a 6-week course of naproxen may lead to slightly better oral health quality of life improvements than celecoxib, although it is not clear if this observation is clinically relevant. Two other controlled studies showed that selective serotonin uptake inhibitors accompanied by psychological therapy improved oral health quality of life in individuals with TMJ arthralgia.

- All therapeutic interventions reported in the identified publications lead to at least some improvement of oral health quality of life. However, this does not apply to TMJ surgery.

Future research should be directed at the following:

- Therapeutic intervention trials should consider oral health quality of life as a core outcome variable.

Is there a superiority of multimodal as opposed to simple therapy in patients with temporomandibular disorders? (Türp et al.)

The present investigation (Türp et al. 2007b) compares outcomes of simple and multimodal management strategies in individuals with TMDs. Pain is the most common motivation for these patients to seek care. Different therapeutic options are available ranging from patient education to joint surgery. 'Simple therapy' was defined as care provided by a dentist, without using technical dental interventions. The study reports were divided according to the main presenting symptom: (1) disc displacement without reduction with pain; (2) TMD pain, without major psychological symptoms; (3) TMD pain, with major psychological symptoms.

- The review demonstrated that in the disc displacement group with pain, multimodal therapy was not superior to explanation and advice. Hence, these individuals do not require more than simple therapy. Likewise, subjects with TMD pain exhibiting no major psycho-

logical symptoms, do not need more than simple management. In contrast, patients with TMD pain and major psychological disturbances benefit from an interdisciplinary, multimodal approach.

- It was recognized that refined practical tools for psychological screening by dentists need to be developed. Furthermore, dental education needs to put emphasis on how to establish an interdisciplinary treatment network in the dental practice setting.

Recommendations for best patient management

- Clinicians' awareness of the psychological ramifications of pain in acute or chronic TMD patients is a deciding factor for providing therapy on the current state of the art. Psychometric screening tools, such as the Graded Chronic Pain Scale (Von Korff et al. 1992), can support dentists to screen patients for pain-associated psychological disturbances.
- For referral to an interdisciplinary team, clinician's knowledge about effectiveness of psychological interventions is fundamental for convincingly educating patients about the multidimensional aspects of pain and its management.

Attrition, occlusion, (dys)function and intervention: a systematic review (Van 't Spijker et al.)

After starting out with 1289 references, successive applications of *a priori* inclusion and exclusion criteria narrowed the search to 32 *in vivo* studies that provided outcome data on attrition. These were not limited to randomized clinical trials, but excluded reviews, case reports, comments, and references in which attrition had another significance than loss of tooth tissue. Other exclusion criteria were non-English articles, 'historical or forensic studies', e.g. skull material. Basically, studies were reviewed if they investigated relationships of attrition with either (1) occlusal factors, (2) function or dysfunction (TMD, bruxism), and (3) intervention or dental treatment history. Also studies on 'occlusal designs for oral reconstruction' and studies aimed at identifying thresholds for restorative vs.

non-restorative interventions were included in the review. The identified studies failed to show any sound evidence justifying the qualification of certain occlusion-based treatment protocols in the management of attrition. In general, the outcome of this review demonstrated that research on attrition is complex and that the literature does not provide clear evidence for the efficacy of particular occlusal designs in the management.

- It was recognized and endorsed that the studies selected for the category occlusal parameters showed large heterogeneity in study design, sample composition,

research question, and measurement method, which made pooling of outcome data invalid.

- A correlation between anterior attrition and absent posterior teeth was not reported. Some support was found regarding anterior (spatial) relationships and attrition. As could be expected, anterior guidance, which is partially determined by vertical overbite and horizontal overjet, seems to reduce the risk for posterior attrition, although it may perhaps be regarded as a risk factor for anterior attrition.
- The literature provides no data regarding the amount of lost tooth tissue due

to attrition for different occlusal schemes.

Future research should be directed at the following:

- Prospective cohort studies investigating thresholds, at which interventions are indicated in patients with attrition.
- Validation studies of reproducible methods for measuring attrition clinically.
- Clinical prospective cohort studies to determine the degree of association between anterior attrition and absent posterior teeth.

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