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### Modifications to the PUFA Index: Are They Justified at This Stage?

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We, the authors of the original publication presenting the PUFA/pufa index of clinical consequences of untreated dental caries [1], read with interest the publication by Baginska and Stokowska [2] entitled ‘Pulpal involvement-roots-sepsis index: a new method for describing the clinical consequences of untreated dental caries’ recently published in *Medical Principles and Practice*. In their publication, Baginska and Stokowska [2] used the original PUFA index and then made comparisons with their proposed modifications to the index: the pulpal involvement-roots-sepsis (PRS/prs) index.

First of all, we are pleased to observe the steady increase in papers recognizing the need to record the clinical consequences of untreated dental caries in order to supplement information collected through the more routinely used indices for dental caries. This trend is evidenced by about a dozen papers related to the use of the PUFA index, including national oral health surveys [3, 4]. We noted the encouraging statement that the PUFA index was considered to be ‘a valuable measurement tool to record the clinical consequences of untreated dental caries’ in the context of the national oral health survey in Poland. We were therefore surprised that, in spite of this, further modifications to the original PUFA index were proposed [2].

Secondly, we wish to emphasize that the PUFA index is not an index of treatment need but rather an index to quantify the consequences of untreated caries. This differentiation is important since the modifications proposed by Baginska and Stokowska [2] aim to merge these two objectives into one index, which is not necessary or conceptually justified. The examples given relate to the scoring of ‘P/p’ (visible pulpal involvement of severely decayed teeth) and ‘U/u’ (ulceration caused by sharp edges of dislocated tooth fragments). With respect to these components, Baginska and Stokowska [2] consider that both codes do not distinguish adequately between cases where a tooth could be retained through endodontic and other treatments and those where extraction might be indi-

cated. This observation is entirely correct but, as stated above, the PUFA index was never designed to function as a treatment needs index, nor was it ever proposed to be used in isolation without recourse to other routinely used indices for dental caries [1]. In this respect, we made explicit reference to the DMFT index and the current WHO standard methodology by stating that: ‘The index defines four different clinical stages of advanced caries providing “a face of the reality” to the prevailing and often ignored oral conditions. Presenting data based on the PUFA index will provide health planners with relevant information, which is complementary to the DMFT.’ [1]

Decisions about treatment need are inevitably linked to the resources and capacities of the health system setting. For instance, in many low- and middle-income countries the choices for interventions are limited and extraction of teeth with an open pulp with or without an abscess or fistula is often the only realistic way to relieve pain. PUFA can help to prioritize treatment by allowing the selection of patients with high PUFA scores when resources are scarce, but it specifically does not give indications as to what type of intervention should be applied.

Furthermore, the attempt of Baginska and Stokowska [2] to design an index that provides at the same time information on the consequences of untreated caries and information on treatment needs, i.e. the proposed pulpal involvement-roots-sepsis index as it appears in table 1 of their publication, seems to have failed in achieving its objective. For instance, the PRS index proposes only endodontic treatment for pulpal involvement (P/p) irrespective of whether primary or permanent teeth are involved, although in the accompanying text the authors acknowledged the very real financial (and other) barriers that exist in less affluent societies. While options concerning a different management for primary and permanent teeth are presented for the PRS index, in cases scoring sepsis (S/s) the same argument applies. It is for this reason that, under the section on treatment needs for dental caries in the WHO Oral Health Survey methodology, there is an acknowledgement that: ‘Countries vary greatly in the capacity of the dental profession to meet demands for oral health care and in professional attitudes and treatment technique.’ [5] The same section then goes on to say that: ‘examiners are encouraged to make use of their own clinical judgment when making decisions on what type of treatment would be appropriate, based on what would be the probable treatment for the average person in the community or country’. Rigid treatment need indicators, as presented in the PRS index, are therefore not appropriate.

Another consideration is that in an epidemiological survey it would be unlikely to only examine the clinical consequences of untreated dental caries and their associated treatment needs without also considering other aspects of dental caries. It is perhaps with this in mind that the FDI World Dental Federation, as a result of a complex expert consultation, has included the PUFA index in its new model for caries classification and management [6].

While we wholeheartedly welcome all suggestions for improving the relevance and appropriateness of the PUFA index, it should be borne in mind that the description of the PUFA index was only published 3 years ago, and for the moment the reports about its use in epidemiological surveys in different populations with different patterns of caries are still limited. Therefore, it may be premature at this stage to propose modifications to the original PUFA index. Such modifications can only lead to confusion and may result in eventual problems of data comparability. Moreover, they detract from the main intention of the index which is to demonstrate the unacceptably high levels of untreated caries, their severity and the associated impact on health and quality of life in order to facilitate appropriate action, which DMFT data alone has oftentimes failed to do in the past.

We are currently compiling studies that were performed with the PUFA index. With the growing and more reliable body of experience, we plan to convene an expert meeting in the near future to review the index and to determine its strengths and weaknesses in real life applications as a basis for possible modifications. In the meantime, researchers and public health personnel should attempt to make extensive use of the index, which has so far been proven to be easy to use and integrate into existing surveillance activities.

A supportive tool kit is available to facilitate this, and active reporting of studies that use the PUFA index in the manner that was proposed in the original publication [1] would be very welcome.

### References

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## Reply

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We would like to thank Holmgren and colleagues [1] for their comments regarding our article presenting the pulpal involvement-roots-sepsis index [2]. We would also like to take this opportunity to congratulate the authors of the PUFA index on developing the first epidemiological tool for the assessment of advanced stages of caries and their consequences [3].

We are aware that the PUFA index is a very valuable initiative. At the beginning of the 21st century, severe dental caries remains a significant problem for both children and adolescents. As Holmgren and colleagues [1] mentioned in their letter, the PUFA index was included in the Caries Matrix developed by Fisher et al. [4], which should be understood as calling the attention of the FDI Science Committee to the weight of this problem. The Caries Assessment Spectrum and Treatment (CAST) index, which includes codes related to pulpal involvement and oral sepsis [5], was among the 7 indices selected by the Committee for evaluation. The fact that FDI members are aware that new indices will continually be developed is proven by their appeal to authors of such tools to inform the FDI Global Caries Initiative Task Team of the ways in which their instruments correspond to the Caries Matrix [4].

Poland is a country situated in Central Europe and a member of the European Union, yet despite that caries in children is a very serious social problem. We therefore took great interest in the publication of Monse et al. [3] presenting the PUFA index and shortly

thereafter conducted an epidemiological survey using it [6]. We evaluated this index as a valuable measurement tool to record the clinical consequences of untreated dental caries. However, during the above mentioned survey, our attention was already drawn to the fact that the P (pulpal involvement) component in reality is comprised of two different clinical conditions. It is beyond doubt that a tooth with retained walls and a tooth with completely destroyed crown tissues with only roots left are two different dental problems. We also noticed that in our sample population the percentage of teeth with extensive crown tissue damage was considerable. Further inspiration was provided by the publication concerning the CAST index [5], the authors of which introduced PUFA components into their index. They turned their attention to the slight percentage of teeth in which soft tissue ulceration was diagnosed, as well as to the fact that it was advantageous to combine both codes related to oral sepsis with each other.

We found that our doubts were sufficient to develop our own modification of the PUFA index, named the pulpal involvement-roots-sepsis (PRS) index, which was tested in an extensive epidemiological survey. The results obtained, published in an article in *Medical Principles and Practice* [2], corroborated our hypothesis that such a change in the codes was justified. It is noteworthy that it did not influence the amount of recorded consequences of untreated dental caries so that the data obtained by means of the PRS

index may be freely compared with the results of studies using the PUFA index, which was one of the fears expressed by the authors of the PUFA index.

The PRS index, as designed, allowed obtaining not only the data concerning the occurrence of severe caries in the surveyed population, but also information regarding the therapeutic effort, thus providing the cost of treatment in the analysed sample population. We think that every tool that communicates information concerning the kinds of dental treatment needs to the public, including the institutions responsible for shaping the health policy, is valuable.

Naturally, we are fully aware that there are great disparities among individual countries and regions in relation to the possibility of treatment of dental caries, including its advanced forms. These differences are primarily caused by economic conditions. There are other examples of indices that evaluate treatment needs, e.g. the CPITN index related to periodontal diseases is based on such a pattern [7]. In many populations the choice of periodontal treatment is limited due to costs, but this does not necessarily mean that the index is not applicable. At this point, we want to emphasize again that, when using the PRS index and classifying teeth into individual categories, the examiner should be guided by the possibility of reconstruction of the tooth crown after the endodontic treatment. Thus the roots (R) code should be given to such teeth that cannot be retained in the oral cavity due to the degree of destruction of hard tissues. We are convinced that the distinction of the group of dental roots emphasizes the significance of caries treatment so that it is possible to retain full dentition until its physiological replacement (deciduous teeth) or until the end of life (permanent teeth).

We are pleased that the PRS index presented by us was met with a positive response from the international dental society. However,

we are aware that it will be critically evaluated in other studies and probably will further evolve. The authors of the PUFA index can already collect results of independent studies and evaluate the strong and weak points of the tool proposed by them. We hope that they will treat our publication as a voice in the academic discussion. It is highly probable that both indices will find their users, depending on the purpose of the study.

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