

# **Formulating Clinical Practice Guidelines for Magnetic Attachment Applications – Process and results of the survey with Delphi method –**

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In the era of evidence-based medicine, clinical practice guidelines (CPG) have become an integral task of each academic society, and council for the dental care of this society also performed a questionnaire survey preparing for CPG for the magnetic attachments. And a total of 147 clinical questions (CQs) were returned and divided into 5 categories according to their applications. Each category was dealing with implants, with type of defect, with occlusion and periodontics, with arrangement and configuration and with management or others. And 14 typical CQs for CPGs were selected. The committee asked each prosthodontic department of several university for each CQ to conduct a literature search and write thorough systematic reviews. However relating literatures for each CQ lacked and formulating CPG according to the GRADE group system was quite complicated. Therefore the committee asked 71 clinical experts named “consensus group” to reply the same questionnaire at 2 times presenting the former results and analyzed the effect for each outcome according to Delphi method.

## **Objective**

The objective of this survey was to analyze opinions of clinical experts of MAs and to develop a consensus of opinion for CQs in the absence of evidence providing guidance on topics that have not studied in RCT.

## **Materials and Methods**

Council for the dental care of this society performed a questionnaire survey preparing for CPG for the magnetic attachments. And total of 147 clinical questions (CQs) were divided into 5 categories according to their applications and 14 typical CQs shown below were selected.

### 1) Implant

- (1) In case of implant-supported overlay dentures, are magnetic attachments (MAs) more effective than other types of retainers?
- (2) In case of implant-supported overlay dentures, is the application of MAs to implant abutments superior to applying them to natural teeth?
- (3) When applying magnetic MAs to implant-supported overlay dentures, are maxillary applications superior to than mandibular ones?
- (4) When applying magnetic MAs to implant-supported overlay dentures, are multiple abutments with MAs more effective than single abutments?

### 2) Defects

- (5) In cases in which individuals have few mandibular teeth, is the application of MAs more

- effective than the use of other types of retainers?
- (6) In cases involving removable partial dentures with a free-end saddle, is the application of MAs more effective than the use of other types of retainers?
- (7) In cases involving overlay dentures, is the application of MAs more effective than the use of other types of retainers?
- 3) Occlusion/Periodontics
- (8) In case of partially edentulous patients without occlusal contact, are MAs superior to other type of retainers?
- (9) In cases of partially edentulous with undulating occlusal planes, is the application of MAs more effective than the use of other types of retainers?
- (10) When periodontal disease is affecting remaining abutments, is the application of MAs superior to the use of other types of retainers?
- 4) Arrangement / Form
- (11) When applying MAs to multiple abutment teeth, are symmetrical arrangements more effective than asymmetrical ones?
- (12) When applying MAs to remaining abutment teeth, are flat type keepers more effective than dome-shaped keepers for stability of the denture?
- 5) Management/etc.
- (13) When undergoing MRI examinations, are there more artifacts in the images with MAs than there are in those with other types of retainers?
- (14) When applying MAs to removable partial dentures, is the applied pressure method superior to minimum pressure ones?

The committee asked each prosthodontic department of several university in which staff belong to JSMAD for each CQ to conduct literature searches and summarize systematic reviews. However corresponding literatures or high-quality clinical data for each CQ were limited in number or nothing. Therefore the committee selected 71 clinical experts of MAs named “consensus group” from 36 members and 35 non-members of JSMAD and asked them to reply the questionnaire according to Delphi method in order to achieve consensus of clinical opinions.

Ten CQs in the absence of evidence from 14 CQs above were selected for the Delphi questionnaire. The questionnaire was framed with 11 outcomes which were affected or not affected by applying MAs in each CQ (Table 5). The degree of effects on each outcome was selected to mark with rating scale from -5 to +5.

The first questionnaire (round 1) contained questions regarding the clinical experience of MA and implant of the experts (Table 1-4).

The committee sent the similar questionnaire at 2 times and in the second questionnaire the committee provided anonymous statistical summaries at the round 1 so that responders can compare with their own opinion (Table 5).

## **Results**

Thirty eight experts of consensus group replied to the questionnaire regarding 11 outcomes in 10 CQs.

The tables below show the clinical experience of the experts (consensus group).

### Clinical experience of the consensus group

Years of clinical experience	Number of persons
10y~	34
5~10y	3
2~5y	1
~2y	0

Table 1: Participants classified by years of clinical experience (N=38)

Number of MA cases	Number of persons
10~	35
5~9	2
1~4	1
None	0

Table 2: Participants classified by number of cases of MA (N=38)

Years of clinical experience of implant cases	Number of persons
10y~	17
5~10y	9
~5y	2
None	10

Table 3: Participants classified by years of clinical experience of implant cases (N=38)

Number of MA cases in implant	Number of persons
10~	13
5~9	4
1~4	7
None	14

Table 4: Participants classified by number of cases of MA applied to implant (N=38)

### Results of the Delphi method

The results of this 2 rounds survey showed convergence to non-effective (0) or bimodal distributions.

The tables below show the result of CQ6. The upper value of each column shows rating scale from -5 to +5 and the lower value of each column shows distribution of numbers of experts. Red bold value shows the results of round2 different from those of round1.

**【CQ6 : In cases involving removable partial dentures with a free-end saddle, is the application of MAs more effective than the use of other types of retainers?】**

- Please select the number below according to the effect on each outcome when you apply MAs on removable partial dentures with a free-end saddle. (Supposing the case was in maxillary

Kennedy class I and abutments were bi-lateral premolars or canines .)

← opposite effective      non-effective      effective →

1. Effective for the retentive force of denture retainers	-5 0	-4 0	-3 0	-2 1	-1 0	0 4	1 0	2 3	3 21	4 6	5 3
2. Effective for masticatory function	-5 0	-4 0	-3 0	-2 0	-1 0	0 17	1 0	2 2	3 10	4 5	5 4
3. Effective for pronunciation	-5 0	-4 0	-3 0	-2 0	-1 0	0 21	1 0	2 1	3 10	4 3	5 3
4. Effective for esthetics	-5 0	-4 0	-3 0	-2 0	-1 0	0 7	1 0	2 2	3 3	4 10	5 16
5. Effective for comfort (wearing sensation or discomfort)	-5 0	-4 0	-3 0	-2 0	-1 0	0 1	1 1	2 2	3 20	4 8	5 6
6. Effective for adaptability (management or repair)	-5 0	-4 0	-3 2	-2 1	-1 0	0 6	1 0	2 2	3 20	4 4	5 3
7. Effective for durability (longevity of abutments or dentures, against periodontal disease/dental caries)	-5 0	-4 0	-3 0	-2 0	-1 0	0 19	1 1	2 3	3 10	4 2	5 3
8. Effective in maintaining sound periodontal tissue	-5 0	-4 0	-3 1	-2 0	-1 0	0 17	1 1	2 9	3 3	4 3	5 4
9. Affect on imposition (physical and time consuming strain on patients or doctors)	-5 1	-4 1	-3 1	-2 3	-1 0	0 26	1 1	2 1	3 4	4 0	5 0
10. Affect on harm(damage from tooth reduction or pain)	-5 1	-4 1	-3 4	-2 0	-1 0	0 27	1 1	2 2	3 4	4 0	5 0
11. Effective in reducing the cost	-5 6	-4 1	-3 4	-2 4	-1 0	0 21	1 0	2 1	3 1	4 0	5 0

(Upper value: rating scale, lower value: number of persons, red bold; round2 results different from round1 )

## Discussion

Most of the prosthodontic issues including MAs do not yield to randomized clinical trials or to stepwise quantitative data analysis. In such cases, experts use their training and personal anecdotal experience to assist decision making in a variety of practice contexts. In these circumstances, consensus opinion of experts provides a formal structured process for decision support.

The Delphi method provides anonymity to study participants and has been found to produce more frequent and stable consensus than other methods. Delphi is described as a structured group communication process that allows a clinical decision-making group to resolve complex problems with the goal of producing useful guidance and opinions for decision makers. Delphi technique refines expert opinion data through consideration of anonymous input from other peer experts, generating a considered consensus over repeated applications.

And an open-ended survey should be sent to experts who in turn provide responses that allow the Delphi experimenter to frame items for subsequent surveys. In this survey some experts mentioned indistinct clinical situations on each CQ of MAs at the first round. Therefore detailed clinical situations were added to each CQ at the second round so that responders could suppose similar cases to lead convergence of opinion towards consensus.

The results of this survey tended to converge to non-effective (0) in each outcome which showed diverged distribution at the first round. Also the distribution of the second round tended to converge to a certain value comparing to the first round which represent more effective or opposite effective.

## **Conclusion**

- A total of 14 typical CQs; Implant, 4; Defects, 3; Occlusion/ Periodontics, 3; Arrange/Form, 2; Manage/etc., 2 were selected.
- Delphi questionnaire survey was performed to 71 experts for 10 CQs in the absence of evidence.
- Eleven outcomes which were affected by MAs in each CQ were selected and were evaluated with rating scale from -5 to +5.
- Thirty eight experts replied and more than 10 had no clinical experience of applying MAs to implants.
- The distribution of the effect by MAs on each outcome tended to converge at the second survey.

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