

Whether or not to Apply Occlusal Pressure in Fixation of Magnet Assembly to Denture? - Evaluation using Delphi Technique -

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Introduction

It is important to distribute the occlusal force to mucosa and abutment efficiently in magnet-retained overdentures. The difference of tissue displacement between the tooth and mucosa is the most common precipitating factor of the overstressing to the abutment tooth. However there are few articles related to this subject; how to fix the magnet assembly to denture base in magnet-retained overdentures. Thus, it is difficult to build consensus if we have only insufficient and/or poor clinical evidences.

Consensus method with questionnaire for experts has been occasionally used to build the consensus. The Delphi technique is a typical method of the consensus method. The questionnaire survey is conducted for experts and the grade of the consent to questions is investigated. This questionnaire survey is repeatedly conducted until the consensus is built.

Objective

The purpose of this study was to build the consensus: whether or not apply occlusal pressure in the fixation of magnet assembly to denture base using Delphi technique with the reference to the expert's opinions. This presentation describes the outline of the Delphi technique effective to draw

up the clinical practice guideline on magnetic attachment with insufficient evidence.

Materials and Methods

◆ Process of questionnaires using Delphi technique

Process of questionnaires survey was as follows:

1. Selection of experts and making the questionnaire.
Dental Care Council, the Japanese Society of Magnetic Applications in Dentistry picked 71 prosthodontists who were familiar with magnetic attachments as the experts.
2. Giving out the questionnaire to the experts, collecting and tallying up the answer sheets.
3. Giving out the questionnaire with the outcomes of previous answers and collecting the answer sheets again (Table 1).

Table 1: Second questionnaire
The number below is outcomes of first answer.

Clinical Question (CQ):
How is it harmful when the magnet assembly is fixed to denture by no occlusal pressure?

Completely oppose: -5 neutral: 0 completely agree: 5

| | | | | | | | | | | | |
|--|----|----|----|----|----|----|---|---|---|---|---|
| ➤Effective in retentive force of prostheses | -5 | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| | 4 | 0 | 6 | 5 | 3 | 6 | 3 | 3 | 4 | 0 | 1 |
| ➤Effective in masticatory function | -5 | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| | 4 | 2 | 6 | 5 | 3 | 9 | 1 | 2 | 2 | 1 | 1 |
| ➤Effective in phonetic function | -5 | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| | 3 | 0 | 3 | 2 | 2 | 23 | 0 | 0 | 2 | 1 | 0 |
| ➤Effective in aesthetic | -5 | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| | 4 | 1 | 1 | 1 | 1 | 25 | 0 | 0 | 1 | 2 | 0 |
| ➤Effective in comfortableness | -5 | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| | 4 | 1 | 4 | 6 | 6 | 11 | 2 | 0 | 1 | 1 | 0 |
| ➤Effective in management of prostheses | -5 | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| | 4 | 1 | 4 | 2 | 4 | 17 | 1 | 1 | 0 | 1 | 0 |
| ➤Effective in permanence of abutment teeth and/or denture | -5 | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| | 7 | 3 | 8 | 6 | 3 | 7 | 0 | 1 | 0 | 0 | 1 |
| ➤Effective in health of periodontal tissue | -5 | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| | 4 | 5 | 9 | 4 | 2 | 9 | 1 | 0 | 1 | 0 | 0 |
| ➤Task body of patient/dentist and loss of time | -5 | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| | 1 | 0 | 3 | 8 | 0 | 20 | 0 | 2 | 1 | 1 | 0 |
| ➤Harmful to abutment teeth and patient(e.g. tooth preparation, pain) | -5 | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| | 1 | 0 | 2 | 4 | 2 | 22 | 1 | 0 | 4 | 0 | 0 |
| ➤Effective in reduction of cost | -5 | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| | 4 | 1 | 1 | 1 | 0 | 28 | 0 | 0 | 1 | 0 | 0 |

◆ Decision of consent level

Consent level was decided by convergence level and median (Table 2). Convergence level was provided as follows: “high” of 3 or less distributions, “medium” of 4 to 6 distributions and “low” of 7 or more distributions exclude 2 or less frequency. Consent level was defined as PP: strong positive agreement, P: light positive agreement, N: light negative agreement, NN: strong negative agreement and U: unidentified

Table 2: Decision of consent level
 Consent level was decided by convergence level and median.

| | median \leq -2 | -2 < median < 2 | 2 \leq median |
|----------------------------|------------------|-----------------|-----------------|
| convergence level : high | NN | U | PP |
| convergence level : medium | N | U | P |
| convergence level : low | U | U | U |

convergence level: high 3 or less distributions exclude 2 or less frequency
 convergence level: medium 4 to 6 distributions exclude 2 or less frequency
 convergence level: low 7 or more distributions exclude 2 or less frequency

Consent level
PP : strong positive agreement
P : light positive agreement
N : light negative agreement
NN : strong negative agreement
U : unidentified

Results

The answers were obtained from 38 experts; 25 specialists on dental implant and 13 on prosthodontics.

Figure 1 shows the frequency distribution concerning the questions: “Effective in permanence of abutment teeth and/or denture” and “Effective in health of periodontal tissue”. When the magnet assembly is fixed to

denture by no occlusal pressure, consent level toward these two questions was N of light negative agreement.

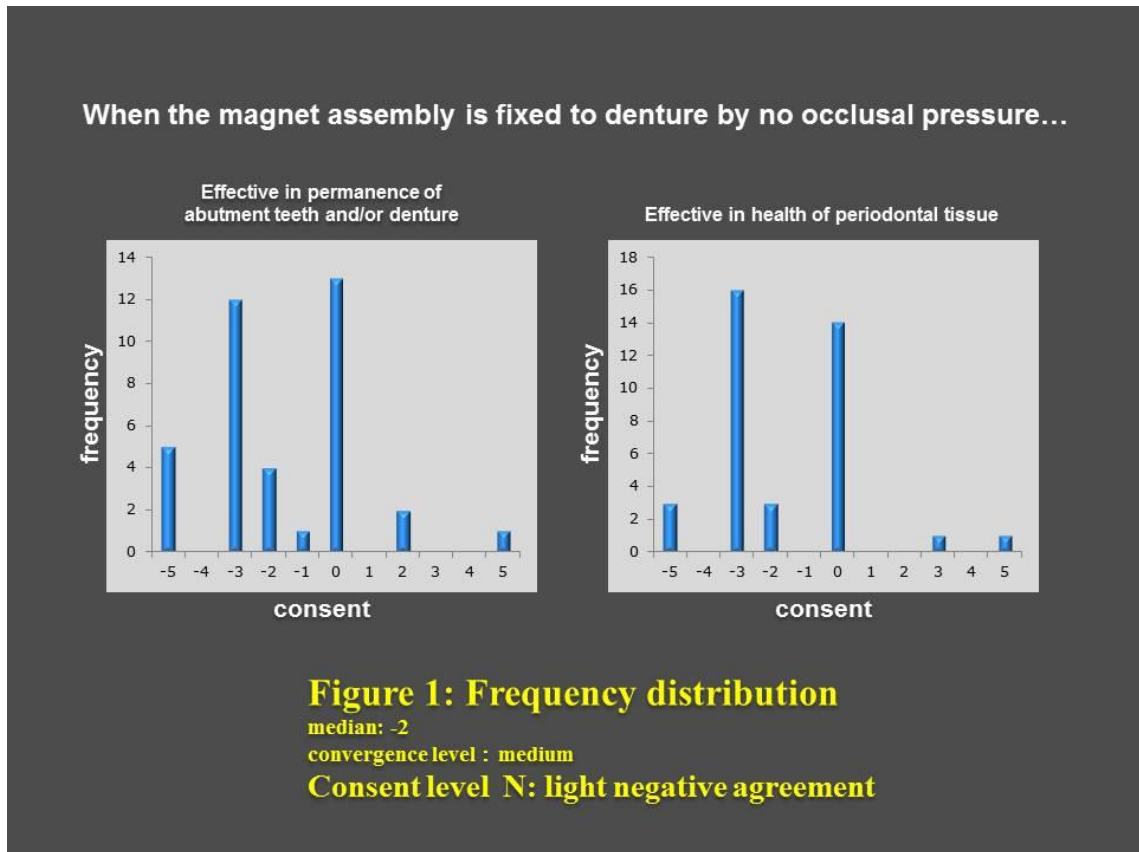


Table 3 shows the consent level of each questions and the recommendation level. Convergence levels toward “Effective in phonetic function”, “Effective in comfortableness”, “Task body of patient/dentist and loss of time” and “Harmful to abutment teeth and patient” were “high” with medians of 0. In other words, phonetic function, comfortableness, suffering to patients and/or dentists and harm were not affected by occlusal pressure when the magnet assembly was fixed to the denture. Recommendation level toward this CQ: “How is it harmful when the magnet assembly is fixed to denture by no occlusal pressure?” was N of light negative agreement synthetically.

Table 3: Consent level of each question and recommendation level

When the magnet assembly is fixed to denture by no occlusal pressure...

| Questions | Median | Convergence level | Concent level |
|---|--------|------------------------------------|---------------|
| Effective in retentive force of prostheses | -2 | low | U |
| Effective in masticatory function | 0 | low | U |
| Effective in phonetic function | 0 | high | U |
| Effective in aesthetic | 0 | medium | U |
| Effective in comfortableness | 0 | high | U |
| Effective in management of prostheses | 0 | medium | U |
| Effective in permanence of abutment teeth and/or denture | -2 | medium | N |
| Effective in health of periodontal tissue | -2 | medium | N |
| Task body of patient/dentist and loss of time | 0 | high | U |
| Harmful to abutment teeth and patient(e.g. tooth preparation, pain) | 0 | high | U |
| Effective in reduction of cost | 0 | medium | U |
| Recommendation level | | N: light negative agreement | |

Discussion

When the magnet assembly is fixed to denture by no occlusal pressure, it is harmful to the health of periodontal tissue in abutment teeth, however no clinical evidences about the quantity of occlusal pressure were shown. Furthermore, it is important for the prognosis of abutment teeth how much pressure from impression material to the tissue under denture base was, when the denture was fabricated. It is necessary to build the clinical evidences and consensus of these subjects.

Conclusions

The evaluation using Delphi technique suggested that it was harmful to

the health of periodontal tissue of abutment teeth when the magnet assembly was fixed to denture by no occlusal pressure. Moreover, the moderate occlusal pressure to the tissue under denture is recommended when the magnet assembly is fixed to denture.

References

- 1) Lightfoot WS, Hefti A, Mariotti A. : Using a Delphi panel to survey criteria for successful periodontal therapy in anterior teeth. *J Periodontol.* 76(9):1508-12, 2005.
- 2) Bourgeois DM, Llodra JC. : Strategies to promote better access to over the counter products for oral health in Europe: a Delphi survey. *Int Dent J.* 59(5):289-96, 2009.
- 3) Buunk-Werkhoven YA, Dijkstra A, van der Schans CP. : Determinants of oral hygiene behavior: a study based on the theory of planned behavior. *Community Dent Oral Epidemiol* 39(3):250-9, 2011.
- 4) Ni Riordain R, Meaney S, McCreary C. : A patient-centered approach to developing a quality-of-life questionnaire for chronic oral mucosal diseases. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 111(5):578-86, 2011.