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RESEARCH ARTICLE

A COMPARISON OF INFORMATION RETENTION DURING ORTHODONTIC TREATMENT USING THREE DIFFERENT METHOD (VISUAL – VERBAL – WRITTEN)

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ABSTRACT

Introduction: Information provided to the orthodontic patients depends on the method of knowledge provision. Visual, verbal and reading play an important role in serving the purpose. **Materials and methods**: A pre and post survey design was used to assess the improvement in knowledge retention among 150 orthodontic patients. **Results**: verbal group of patients retained higher amount of information as compared to visual and reading groups. **Conclusion**: Information to the patients should be given using verbal mode of communication.

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INTRODUCTION

The provision of information is an everyday part of orthodontic treatment, and the role of patient involvement in health care delivery is well documented (Enthoven & Vorhaus, 1997). It is important that health care professionals have appropriate skills to communicate with patients. Witt and Bartsch (1996) recommended that special training in communication should be provided for prospective dentists and orthodontists. However, little is known about how much information is understood and retained. Some research in medicine has looked at both short- and long-term retention of information, but there has been little research of this type in dentistry, particularly in orthodontics. It has been argued that, for communication to be effective, the message must be understood and remembered (Ley & Spelman, 1967; Witt & Bartsch, 1996). The importance of information provision and its effect on cooperation were also identified by Brattström et al (1991) and Witt &Bartsch, (1996) who investigated the reasons for lack of patient cooperation and premature termination of orthodontic treatment at the School of Dentistry in Huddinge, Sweden. Over a period of 10 years, 80 patients (4%) terminated treatment prematurely. They were interviewed, and their reasons for not completing treatment included insufficient information about the exact nature of treatment, lack of motivation, and lack of communication between orthodontist and patient. This study concluded that orthodontists require better understanding of psychology and should have some training in information communication to reduce the level of discontinued treatments.

One of the few studies in orthodontics, by Thomson et al (2001) and Jilpa et al (2008)recommended that verbal information given to patients should always be supported by written or visual information. This study also found that parents were more attentive to verbal instructions than their children. Thickett and Newton (2008) investigated the effect of 3 methods of presenting information to orthodontic patients and assessed short and longer term recall. Thirty pretreatment orthodontic patients were randomly allocated to groups receiving written information in 1 of 3 formats: mind map, acronym, and information lea. The study found that there was no major difference in the amount of information retained between the 3 methods, although mind maps and acronyms had a small, but significant advantage over written information leaflets in patient recall. Ley (1988), Newton (1995), and Witt and Bartsch (1996) noted the importance of communication skills in medicine and dentistry in order to improve the quality and amount of information that the patient receives, understands, and retains. Improved communication is associated with greater patient satisfaction, increased

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compliance, reduced anxiety, and improved treatment outcome. These, in turn, may lead to reduced treatment times and, as a consequence, to lower costs. It is also important to be aware that errors in communication can prompt allegations of malpractice (Newton, 1995). It can be regarded as somewhat unfortunate to find that patients tend to be unhappy with the amount of information they receive from their dentist, and often the information given is misunderstood or forgotten (Witt & Bartsch, 1993). Treatment tends to have a better clinical outcome and patients are more compliant if they are well informed, especially if they have been involved in making treatment decisions (Lefer et al, 1962).In spite of an increased awareness of the importance of communication skills, there is no evidence which implies that the problems of dissatisfaction with communication and the subsequent low cooperation with treatment requirements have been resolved (Ley, 1972).

Witt and Bartsch (1993) studied the retention of information provided during an initial orthodontic consultation. On average, just over 30 per cent of single information units were recalled correctly by the patient after 10 days. Patients were found to particularly recall those issues that concerned and interested them and affected everyday life. Witt and Bartsch (1996) investigated the effects of providing information and communication during orthodontic consultation and treatment. They stated that doctor–patient communication was the key to the establishment and maintenance of patient compliance. Nanda and Kierl (1992) and Thomson et al (2001) also stated that successful orthodontic treatment depended not only on the knowledge and skills of the clinician, but also on the cooperation of the patient and parents. They noted that the relationship between the dentist and patient or parent was the best long-term predictor of patient cooperation and that by improving communication with patients, it may be possible to 'salvage' a potentially uncooperative patient. To date there have been few studies that have compared the understanding and recall of information, given in different formats to orthodontic patients at their initial consultation.

Aim of the study: To compare the retention of orthodontic information provided in three different groups : written, visual, and verbal.

MATERIALS AND METHODS

- The subjects for this study were selected from dental clinics in Riyadh, Saudi Arabia over 3 months period.
- All patients were between ages of 18 to 35 years.
- The subjects were allocated alternately to receive information in one of three given formats: written, visual, or verbal.
- 50 patients were selected into each of the three categories.
- Ethical approval was obtained from the Joint Research and Ethics Committee of the hospital involved in the study from Riyadh ELM University(RC/IRB/2018/1318).
- An approved consent was obtained from each patient before participation.
- This was subjected to a Gunning Fog readability test, as described by Albert and Chadwick (1992; Appendix 1).
- The English questionnaire was translated to Arabic language and was checkedand retranslated back to English by a bilingual translator to validate the translation (Appendix 2 TR).

Implementation

- Each patient was given the leaflet to read in their own time.The leaflet wastaken away before asking the subjects to complete the questionnaire (Appendix 2 TR), which they were not permitted to take it home.
- The visual method provided the same information as in the leaflet, in exactly the same order, but only in pictorial format. Images were scanned into a Power Point (windows XP) presentation and 20 slides were shown. Each slide had an illustration and short caption. A small presentation was given sharing the same information as the other two formats and after completion, the patients were asked to complete a questionnaire.
- The information in the verbal format was provided in exactly the same manner as the other two methods, but with no further supplementation. Subjects were not allowed to ask any further for that questionnaire.
- Both short and long term retention of the information was assessed using an identical questionnaire that has been designed in conjunction with a statistician and a clinical psychologist (Appendix 2 TR).
- A combination of open and closed questions as used, related to the relevant points of information given.
- All patients were informed that they would be required to complete two questionnaires: the first, 10–15 minutes after receiving the information, to assess short-term retention, and the second 4 weeks later, to test long-term retention.
- The second questionnaire was asked after a month during orthodontic treatment follow up.
- Test was used to compare the proportion of correct responses for patient, within each individual group
- Statistical analysis was undertaken using SPSS version 19 for Windows.
- For both questionnaires, the results were divided into patient responses within each of the three groups (written, verbal, visual).

RESULTS

Tables 1,2 and 3 show the change in the level of knowledge among the orthodontic patients. Findings were recorded in two stages. First was the 'pre-test', followed by 'post-test'. These numbers are mentioned in percentage of participants answering the questions in survey. Finally, the differences in percentages have been mentioned in both cases of improvement or otherwise. Table 4 shows the perception and experience of orthodontic patients about braces, with large majority opting for the fact that braces make the teeth aligned and difficulty in eating was the major drawback. Non parametric test was conducted using Wilcoxon Signed Ranks.

DISCUSSION

This study aimed to determine any change in the knowledge of orthodontic patients regarding the information provided to them. Three different modes of communication were utilized in order to make a valid comparison. Knowledge retention was the major concept behind this study, which was studied in two stages. Our aim was to determine the best mode of education and delivering knowledge to the patients.

Table 1. Change in the knowledge of patients after visual observation

Variables	Pretest	Posttest	Difference	P-value
What does braces do?	Straighten teeth: 100%	Straighten teeth: 100%		
	Incorrect answer: 0%	Incorrect answer: 0%	=	1.000
Duration of Orthodontic treatment?	2-3 years: 81%	2-3 years: 77%		
	Incorrect answer: 19%	Incorrect answer: 23%	⇓ 4%	.480
Frequency of braces checking?	Every 4-6 weeks: 83%	Every 4-6 weeks: 87%		
	Incorrect answer: 17%	Incorrect answer: 13%	⇓ 4%	.527
Feeling after fitting of braces?	They may ache a bit: 94%	They may ache a bit: 96%		
	Incorrect answer: 6%	Incorrect answer: 4%	⇓ 2%	.655
Most common type of braces?	Train tracks: 92%	Train tracks: 92%		
	Incorrect answer: 8%	Invisible line: 8%	=	1.000
Frequency of brushing?	After every meal: 85%	After every meal: 88%		
	Incorrect answer: 15%	Incorrect answer: 12%	⇑ 3%	.480
What if braces are not cleaned?	Will develop decay and gum disease: 85%	Will develop decay and gum disease: 85%		1.000
	Incorrect answer: 15%	Incorrect answer: 15%	=	
How braces may affect daily life?	Correct answer: 63%	Correct answer: 65%		
	Incorrect answer: 37%	Incorrect answer: 35%	⇑ 2%	.705
When to see Orthodontist if braces break?	As soon as possible: 94%	As soon as possible: 88%		
	Incorrect answer: 6%	Incorrect answer: 12%	⇓ 6%	.316
Need other dental care during Orthodontic treatment?	Yes: 96%	Yes: 96%		
	Incorrect answer: 4%	Incorrect answer: 4%	=	1.000
When Ortho treatment is finished?	When you don't have to wear any type of braces: 8%	When you don't have to wear any type of braces: 2%		.180
	Incorrect answer: 92%	Incorrect answer: 98%	⇓ 6%	
Orthodontic treatment is contraindicated if you have poor oral hygiene?	Yes: 57%	Yes: 67%		
	Incorrect answer: 43%	Incorrect answer: 37%	⇑ 10%	.285

Table 2. Change in the knowledge of patients after verbalobservation

Variables	Pretest	Posttest	Difference	p-value
What does braces do?	Straighten teeth: 80%	Straighten teeth: 73%	⇓ 7%	.248
	Incorrect answer: 20%	Incorrect answer: 27%		
Duration of Orthodontic treatment?	2-3 years: 48%	2-3 years: 52%		
	Incorrect answer: 52%	Incorrect answer: 48%	⇑ 4%	.414
Frequency of braces checking?	Every 4-6 weeks: 50%	Every 4-6 weeks: 52%		
	Incorrect answer: 50%	Incorrect answer: 48%	⇑ 2%	.782
Feeling after fitting of braces?	They may ache a bit: 64%	They may ache a bit: 70%		
	Incorrect answer: 36%	Incorrect answer: 30%	⇑ 6%	.405
Most common type of braces?	Train tracks: 75%	Train tracks: 71%		
	Incorrect answer: 25%	Invisible line: 29%	⇓ 4%	.564
Frequency of brushing?	After every meal: 61%	After every meal: 63%		
	Incorrect answer: 39%	Incorrect answer: 37%	⇑ 2%	.763
What if braces are not cleaned?	Will develop decay and gum disease: 77%	Will develop decay and gum disease: 73%	⇓ 4%	.527
	Incorrect answer: 23%	Incorrect answer: 27%		
How braces may affect daily life?	Correct answer: 32%	Correct answer: 41%		
	Incorrect answer: 68%	Incorrect answer: 59%	⇑ 9%	.166
When to see Orthodontist if braces break?	As soon as possible: 55%	As soon as possible: 63%		
	Incorrect answer: 45%	Incorrect answer: 37%	⇑ 8%	.157
Need other dental care during Orthodontic treatment?	Yes: 86%	Yes: 77%		
	Incorrect answer: 14%	Incorrect answer: 23%	⇓ 9%	.166
When Ortho treatment is finished?	When you don't have to wear any type of braces: 2%	When you don't have to wear any type of braces: 5%	⇑ 3%	.157
	Incorrect answer: 98%	Incorrect answer: 95%		
Orthodontic treatment is contraindicated if you have poor oral hygiene?	Yes: 50%	Yes: 50%		
	Incorrect answer: 50%	Incorrect answer: 50%	=	1.000

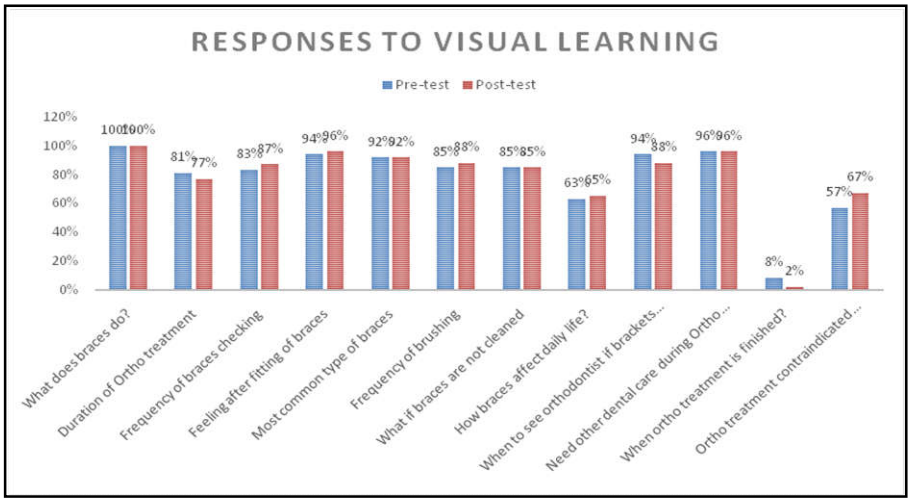

Figure 1. Change in the knowledge of patients after visual observation (Correct answers only)

Table 3. Change in the knowledge of patients after reading observation

Variables	Pretest	Posttest	Difference	p-value
What does braces do?	Straighten teeth: 25% Incorrect answer: 75%	Straighten teeth: 27% Incorrect answer: 73%	⇑2%	.317
Duration of Orthodontic treatment?	2-3 years: 27% Incorrect answer: 73%	2-3 years: 25% Incorrect answer: 75%	⇓ 2%	.564
Frequency of braces checking?	Every 4-6 weeks: 10% Incorrect answer: 90%	Every 4-6 weeks: 6% Incorrect answer: 94%	⇓ 4%	.157
Feeling after fitting of braces?	They may ache a bit: 12% Incorrect answer: 88%	They may ache a bit: 8% Incorrect answer: 92%	⇓ 4%	.157
Most common type of braces?	Train tracks: 75% Incorrect answer: 25%	Train tracks: 60% Invisible line: 40%	⇓ 15%	.005
Frequency of brushing?	After every meal: 29% Incorrect answer: 71%	After every meal: 35% Incorrect answer: 65%	⇑ 6%	.366
What if braces are not cleaned?	Will develop decay and gum disease: 42% Incorrect answer: 58%	Will develop decay and gum disease: 42% Incorrect answer: 58%	=	1.000
How braces may affect daily life?	Correct answer: 1% Incorrect answer: 99%	Correct answer: 0% Incorrect answer: 100%	⇓ 1%	.317
When to see Orthodontist if braces break?	As soon as possible: 12% Incorrect answer: 88%	As soon as possible: 15% Incorrect answer: 85%	⇑ 3%	.414
Need other dental care during Orthodontic treatment?	Yes: 27% Incorrect answer: 73%	Yes: 21% Incorrect answer: 79%	⇓ 6%	.180
When Ortho treatment is finished?	When you don't have to wear any type of braces: 6% Incorrect answer: 94%	When you don't have to wear any type of braces: 6% Incorrect answer: 94%	=	1.000
Orthodontic treatment is contraindicated if you have poor oral hygiene?	Yes: 48% Incorrect answer: 52%	Yes: 52% Incorrect answer: 48%	⇑ 4%	.527

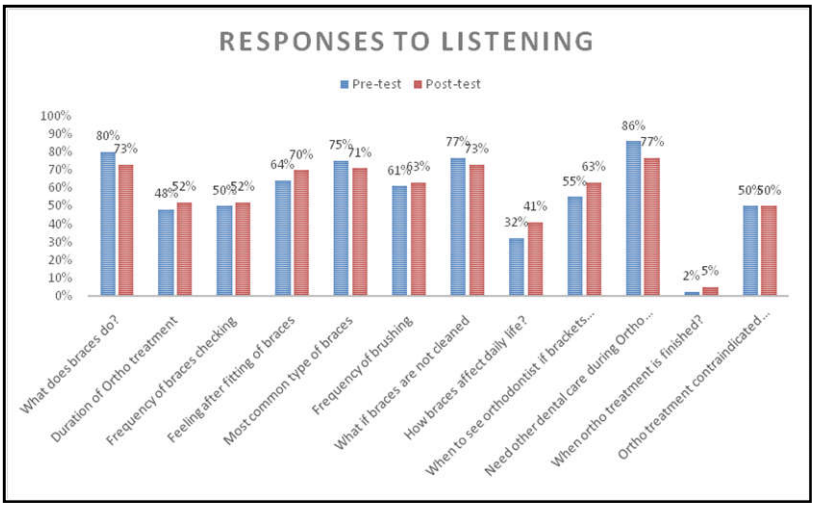

Figure 2. Change in the knowledge of patients afterverbalobservation (Correct answers only)

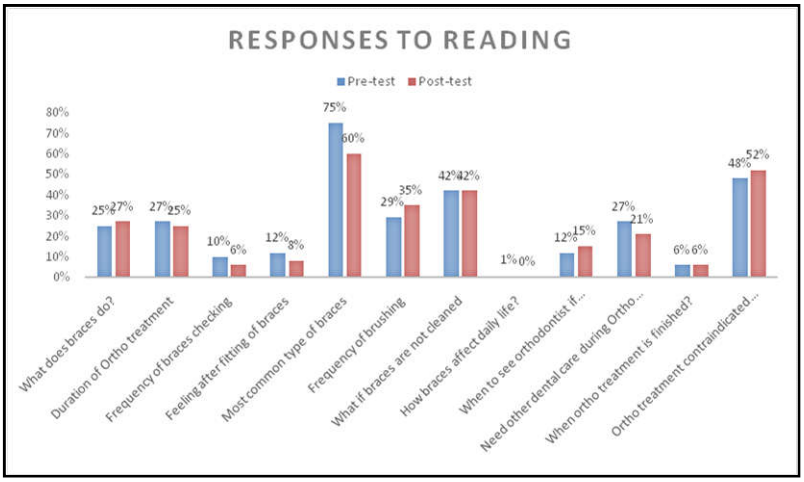

Figure 3. Change in the knowledge of patients after reading observation (Correct answers only)

Table 4. General perception of patients about orthodontic braces

Friends or Family having orthodontic treatment?	Yes: 81%	No: 19%
Good thing about Braces?	Make the teeth straight: 95%	
Bad thing about Braces?	Difficulty in eating: 80%	

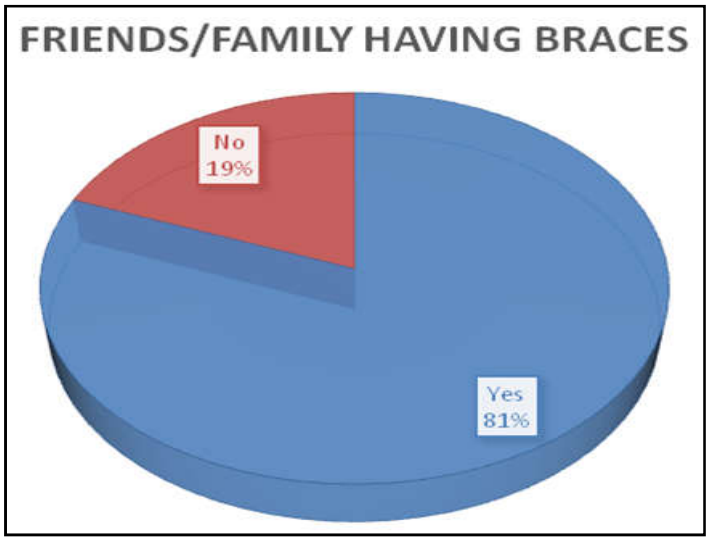

Figure 4. Participants indicating the use of braces among their friends/family

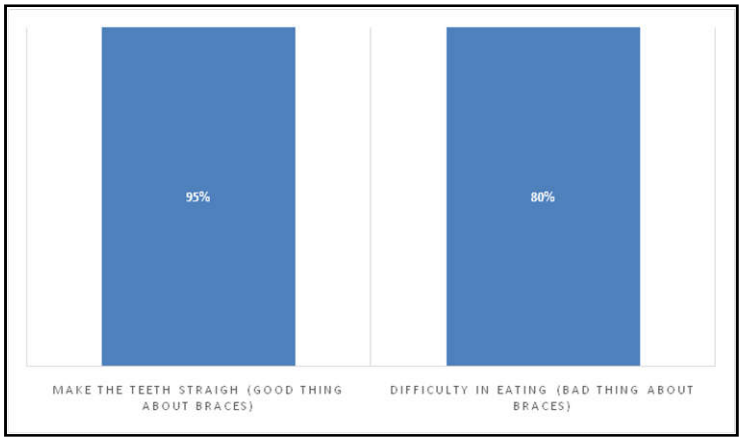

Figure 5. Good and bad thing about braces according to the patients

From our findings, it can be appreciated that the patients tend to retain more information when given verbally as compared to written. Efficacy of verbal information over written has been tried and tested multiple times. The findings of our investigation were supported by the study conducted by Wright et al (2010), which revealed the superior results of information retained by orthodontic patients using verbal mode of communication. As mentioned above, patients using reading as the mode of information retention were found to lack adequate knowledge. This may be due to the differing quality of readable materials available in various dental settings. Use of interactive and interesting reading material plays an important role in increasing knowledge among patients. The length of text as well as readability must be taken care of when providing instructions to the orthodontic patients (Harwood & Harrison, 2003; Bakdash et al, 1983). Visual mode of education has been regarded as the better way of delivering knowledge. Multiple studies have proven this method of teaching and improving knowledge in different populations (Kizilcec et al, 2014; Balemans et al, 2016; Robson et al, 2015). However, the results of our study suggest something else; with the group receiving instructions through visual method were not able to retain information given to them. It can also be noted from the tables that some study participants neither improved nor deteriorated in their knowledge retention received from three methods. This led to another assumption of the possibility that certain patients do not show interest in filling up the survey. Therefore, they tend to provide information that is not accurate and they do that just to fulfill the request of investigators (Althubaiti, 2016; Groves & Peytcheva, 2008).

Conclusion

- Knowledge retained through verbal method was long term and more reliable as compared to visual and reading methods.
- Verbal information given to patients should always be supported by written and/or visual information.

- Increasing sample size may affect the overall findings and result in increased generalizability.

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