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Assessment of Three Multimedia Tools for Improving Patients' Understanding and Adherence to Orthodontic Treatments

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Abstract

Aim: To assess the understanding and the recall of information using three communication tools: a video, a PowerPoint presentation and a flyer. **Methods:** We conducted a randomized clinical trial on a sample of 135 patients, divided into three groups (a) (b) and (c). Each group received a different form of information: a written pamphlet, a PowerPoint presentation and a video. The evaluation was conducted using a survey administered in two phases, in the short term (T1) and in the medium term (T2). **Results:** This study showed that all three tools were equally effective and valid in informing the patient. The results also showed that for some risks the audiovisual tools were better in terms of information including the risk of root resorption, and articular pain with a statistically significant difference. The effectiveness of these tools was different during the two stages T1 and T2 after one month of the first phase of information T1, the results showed no statistically significant difference between the information in the short and medium term. **Conclusion:** This study allowed us to verify the most effective information tool among the three tools used, which allows to establish a validated and reliable communication system within the care unit of Casablanca's department of orthopedics.

Keywords: Orthodontics, Consumer Health Information, Audiovisual Aids, Multimedia, Dental School of Casablanca, Morocco

1. Introduction

The reflection on the doctor-patient communication is generally important in the medical field; and particularly in the dental field. The evolution of modern medicine and the simplification and the keen interest in the electronic information in recent years has exposed the doctor and all the health actors to new challenges to result in the conception of the individual as being autonomous and responsible for his choices in the medical field. This special relationship, which is the subject of many investigations by doctors and human researchers, requires new skills in the field of communication that can be taught and learned by health professionals to care at best for their patients (Richard, 2005; Fournier, 2007).

In orthodontics, when a patient desires to receive an orthodontic treatment, the practitioner must provide him with as much information as possible about the necessary means of investigation, the procedures as well as all the risks inherent to this treatment, so that the patient can consent in a transparent environment. In dental practice, well-informed patients had more reasonable expectations of treatment outcomes and better involvement in therapy. This is particularly important in orthodontics because the long-term cooperation of patients during treatment improves clinical outcomes and the quality of life of patients; it also improves their satisfaction as well as that of the practitioner.

In addition, the involvement of patients in medical decisions reduces their anxiety and improves their cooperation and involvement, which is undoubtedly a guarantee of treatment success and a source of satisfaction for both the practitioner and the patient (Baird, 2003; Oudassi, 2010; Fraval, 2015). In this context, several studies have shown that patients who were well informed, adhered better to the proposed treatments (Fraval, 2015). In this context, the Department of Orthodontics of the dental treatment center Casablanca conducted a study on the recall rates and the understanding of the information transmitted during the informed consent in April 2010. This study showed that the consent process is well working on the diagnosis and the treatment basis. However, the results were unclear concerning the diagnosis of certain potential risks and sometimes irreversible, reported by the patients (Oudassi, 2010).

Knowing that most studies that have attempted to evaluate the recall rate of information related to orthodontic treatment have concluded that future research should focus on methods of improving communication with patients receiving orthodontic treatment (Patel, 2008). The use of other means than the written informed consent form; power point presentations, video or 3D media, could improve the understanding and the recall of information in patients (Fraval, 2015).

To meet this need, we have developed three information tools on orthodontic treatment: a PowerPoint support, a video and a flyer containing exactly the same information. In the present work, we will evaluate the understanding and the degree of recall of the information using these three communication tools to determine the most effective communication support so that we can integrate it into our daily practice within the department of orthodontics in the dental treatment center of Casablanca.

2. Topics and Methods

2.1. *The type of study*

This study is a randomized clinical trial that aimed the evaluation of the effectiveness of three multimedia tools, a written pamphlet, a PowerPoint presentation and a video in improving patients' understanding of the orthodontic treatment.

2.2. *The study population*

Our sample consisted of patients consulting within the orthodontics department of the dental treatment center in Casablanca, Morocco, patients aged 12 years and above. The reason we chose to conduct our study within the

center is due to the easy accessibility, as the need for communication and information was particularly noted in this population in a previous study.

2.3. *The survey*

The survey used in this study was developed on the basis of the results obtained from the previous study on recall rates and the *understanding* of informed consent information.

This questionnaire contained five sections:

- Patient identification
- Evaluation of the understanding of the diagnosis
- Evaluation of the understanding of the treatment plan
- Evaluation of the understanding of the risks of treatment
- Evaluation of the understanding of the means of prevention of these risks.

2.4. *Eligibility criteria*

2.4.1. Inclusion criteria

- Patients older than 12 years old;
- Patients able to speak Arabic or French;
- Patients who consented to start orthodontic treatment;
- Patients being treated for less than three months.

2.4.2. Exclusion criteria

- Psychomotor or learning development disorders
- History of orthodontic treatment
- Brothers or other close family members who had benefited from orthodontic treatment at the orthodontic department of the dental treatment center of Casablanca.
- Patient with a nearby dentist or orthodontist.

2.5. *Randomization method*

The randomization list was prepared by the statistician within the medical informatics laboratory at the Faculty of Medicine and Pharmacy of Casablanca, using the table of figures of the software Epi-info. The numbers of the three groups were distributed according to a list with a distribution according to the block method. A document describing the randomization procedure has been kept confidential in the Methodology and Data Management Center of the Faculty of Medicine and Pharmacy of Casablanca.

2.6. *Ethical approval*

We have submitted a local authorization application to the teachers responsible for the clinical sessions during which the survey will be conducted. Ethical approval was obtained on behalf of the patients in the orthodontic department of the dental treatment center of Casablanca.

2.7. *The study progress*

The first contact with the patients was made during the session of communication of the information by the attending physician. The patients answered the questionnaire the first time, it was the phase T0, and then they were invited to watch the information tools according to the distribution of groups as dictated by the randomization protocol methodologist, right after their attending physician explained the diagnosis, the treatment plan and the risks related to orthodontic treatment. Patients were allowed to ask questions, the same oral information was

provided to answer the different questions of the participants. Then, to evaluate the short-term recall rate, participants responded to the questionnaire a second time, during phase T1, and it was the previously calibrated interviewer who collected the responses. In order to evaluate the long-term recall rate, patients in group (a) kept the flyer, while patients in group (b) and (c) received the power point presentation and the video via a secure YouTube link which was communicated to them by email. The patients were called for the second care appointment, four weeks after the first test, in order to complete the same survey sheet used previously, it was the T2 phase.

2.8. Statistical analysis

The statistical analysis included a statistical description of the population studied; the comparison of the groups was made using the chi-2 test. Data entry, data collection and analysis used Epi-info 3.5.1.fr software within the Medical Informatics Laboratory of the Faculty of Medicine and Pharmacy of Casablanca.

3. Results

3.1. Evaluation of the understanding of orthodontic treatment risks (Phase T0)

Among the 135 patients who responded to the questionnaire,

- 2 (5.7%) patients reported that they knew that the orthodontic treatment has dental side effects, compared to 94.3% who ignored it.
- 7 patients (5.2%) said that caries risk is a potential risk inherent in orthodontic treatment compared to 94.8% who did not know it.
- 6 (4.4%) patients claim to know that the risk of tooth staining is a potential risk inherent to orthodontic treatment versus 95.6% who did not know it.
- All the respondents completely ignored the existence of possible periodontal adverse effects including gingival inflammation, recession and root resorption.
- All the patients were unaware of joint possible risks inherent to orthodontic treatment including blockage, pain and joint noise.
- All the patients stated that they were not aware of the potential risk of recurrence, failure or the possibility of preventing these risks during the orthodontic treatment.

Table 1: Evaluation of the understanding of the risks of orthodontic treatment (Phase T0)

	Frequencies	Percent
Knowledge of dental effects	n=2	5,7 %
carious risk	n=7	5,2%
risk of staining	n=6	4,4%
risk of necrosis	n=135	100%
Knowledge of periodontal effects	n=135	100%
Gingival inflammation	n=135	100%
Recession	n=135	100%
reduction		
Knowledge of joint effects	n=135	100%
blocking	n=135	100%
Pain	n=135	100%
Noise	n=135	100%
Knowledge of the risk of relapse (Yes)	n=135	100 %

Knowledge of behaviour in relapse (Yes)	n=135	100 %
Knowledge of the risk of failure (Yes)	n=135	100 %
Knowledge of causes of failure (Yes)	n=135	100 %
Knowledge of prevention strategies (Yes)	n=135	100 %

3.2. Evaluation of the understanding of the risks of orthodontic treatment (Phase T1)

3.2.1. Assessment of the Knowledge of Dental Adverse Events (Table 2)

Our study showed that for all groups a, b and c, patients were aware that dental undesirable effects may be inherent to orthodontic treatment as well as carious and coloring risks with no significant difference between the three groups. For the risk of necrosis, group (a) was better informed (n = 28) or 80% who responded to this risk against 60% for both groups (b) and (c) with a non-significant difference ($p > 0.005$)

3.2.2. Assessment of the knowledge of periodontal adverse effects (Table 2)

According to our study; the three groups were well informed about periodontal adverse effects, with a percentage of 100%. For the risk of gingival inflammation, the respondents in group (a) were the best informed, with a percentage of 100% against 97.14% for group (b) and 82.9% for group (c) and with a significant difference between the three groups. The highest information rate for the risk of gingival recession was noted in group (b) a percentage of 100% against 97.1% for the group (a) and 82.9% for the group (c) with a significant difference ($p < 0.05$). No significant difference was found for the root resorption risk, between group (a) with a percentage of 51.4%, group (b) with a percentage of 65.7% and group (c) with a percentage of 57.1%.

3.2.3. Assessment of the knowledge of articular effects (Table 2)

For the risk of blocking, an information rate of 85.7% for group (a), 65.7% for group (b) and 71.4% for group (c) with no statistical difference between the three groups. Regarding the risk of pain, the best rate of information was noted for group (b) with 100%, followed by group (a) with a rate of 97.1% and 77.1% for group (c) with a significant difference ($p < 0.05$). For the risk of articular noise, there was a better information rate for group (b) with 100%, and 77.1% for group (a) and (c) with a statistically significant difference ($p < 0.05$).

3.2.4. Assessment of knowledge of the risk of relapse (Table 2)

An information rate of 100% was noted for the three groups (a) (b) and (c) with no noticeable difference between the three groups.

3.2.5. Assessing the knowledge of behavior during relapse (Table 2)

An information rate of 100% was noted for the three groups (a) (b) and (c) with no noticeable difference between the three groups.

3.2.6. Assessment of the knowledge of the risk of failure (Table 2)

An information rate of 100% was noted for the three groups (a) (b) and (c) with no noticeable difference between the three groups.

3.2.7. Evaluation of the knowledge of prevention (Table 5)

An information rate of 100% was noted for the three groups (a) (b) and (c) with no noticeable difference between the three groups.

Table 2: Evaluation of the understanding of the risks of orthodontic treatment (Phase T1)

	a	b	c	Chi-2 test
Knowledge of dental effects	n=35 (100%)	n=35 (100%)	n=35 (100%)	
carious risk	n=35 (100%)	n=35 (100%)	n=35 (100%)	
risk of staining	n=35 (100%)	n=35 (100%)	n=35 (100%)	
risk of necrosis	n=28(80%)	n=21 (60%)	n=21(60%)	0,122 ((NS)
Knowledge of periodontal effects	n=35 (100%)	n=35 (100%)	n=35 (100%)	
Gingival inflammation	n=35 (100%)	n=34 (97,14%)	n=29 (82,9%)	0,009 (S)
Recession reduction	n=34 (97,1%) n=18 (51,4%)	n=35(100%) n=23 (65,7%)	n=29 (82,9%) n=20 (57,1%)	0,009 (S) 0,476(NS)
Knowledge of joint effects	n=35 (100%)	n=35 (100%)	n=35 (100%)	
blocking	n=30 (85,7%)	n=23 (65,7%)	n=25 (71,4%)	0,143 (NS)
Pain	n=34 (97,1%)	n=35 (100%)	n=27 (77,1%)	0,001 (S)
Noise	n=27 (77,1%)	n=35 (100%)	n=27 (77,1%)	0,009 (S)
Knowledge of the risk of relapse (Yes)	n=35 (100%)	n=35 (100%)	n=35 (100%)	
Knowledge of behavior in relapse (Yes)	n=35 (100%)	n=35 (100%)	n=35 (100%)	
Knowledge of the risk of failure (Yes)	n=35 (100%)	n=35 (100%)	n=35 (100%)	
Knowledge of causes of failure (Yes)	n=35 (100%)	n=35 (100%)	n=35 (100%)	
Knowledge of prevention strategies (Yes)	n=35 (100%)	n=35 (100%)	n=35 (100%)	

3.3. Evaluation of the understanding of the orthodontic treatment risks (Phase T2)

3.3.1. Assessment of Knowledge of Dental Adverse Effects (Table 3)

An information rate of 100% was noted regarding the knowledge of dental adverse effects, carious risk, staining and the risk of necrosis with no difference between the 3 groups (a) (b) and (c).

3.3.2. Assessment of knowledge of periodontal adverse effects (Table 3)

The three groups were well informed about the periodontal adverse effects, with a percentage of 100% with no difference between the three groups for risk of gingival inflammation, gingival recession, except for the risk of root resorption where the respondents of group (b) and (c) were better informed with a significant difference ($p < 0.05$).

3.3.3. Assessment of knowledge of articular effects (Table 3)

For the knowledge of the joint adverse effects, and the risk of pain, the information rate was similar between the three groups (a) (b) and (c) with no difference. For the risk of blocking, the candidates in group (c) were better informed than group (a) and (b) with a non-significant difference ($p > 0.05$). Regarding the risk of articular noise, the candidates were better informed with audiovisual tools, group (b) and (c) with a percentage of 100% against 85.7% for the group (a) either one with a significant difference ($p < 0.05$).

3.3.4. Assessment of the knowledge of the risk of relapse (Table 6)

An information rate of 100% was noted for the three groups (a) (b) and (c) with no statistically significant difference between the three groups.

3.3.5. Assessing the knowledge of the behavior in case of a relapse (Table 3)

An information rate of 100% was noted for the three groups (a) (b) and (c) with no noticeable difference between the three groups.

3.3.6. Assessment of the knowledge of the risk of failure (Table 3)

An information rate of 100% was noted for the three groups (a) (b) and (c) with no noticeable difference between the three groups.

3.3.7. Evaluation of the knowledge of means of prevention (Table 3)

An information rate of 100% was noted for the three groups (a) (b) and (c) with no noticeable difference between the three groups.

Table 3: Evaluation of the understanding of the risks of the orthodontic treatment (Phase T2)

	a	b	c	Chi-2 test
Knowledge of dental effects	n=35 (100%)	n=35 (100%)	n=35 (100%)	
carious risk	n=35 (100%)	n=35 (100%)	n=35 (100%)	
risk of staining	n=35 (100%)	n=35 (100%)	n=35 (100%)	
risk of necrosis	n=35(100%)	n=35 (100%)	n=35(100%)	
Knowledge of periodontal effects	n=35 (100%)	n=35 (100%)	n=35 (100%)	
Gingival inflammation	n=35 (100%)	n=35 (100%)	n=35 (100%)	
Recession	n=35 (100%)	n=35 (100%)	n=35 (100%)	
reduction	n=27 (77,1%)	n=35 (100%)	n=35 (100%)	0,0001 (S)
Knowledge of joint effects	n=35 (100%)	n=35 (100%)	n=35 (100%)	
blocking	n=34 (2,9%)	n=34 (2,9%)	n=35 (100%)	0,601 (NS)

Pain	n=35 (100%)	n=35 (100%)	n=35 (100%)	0,005 (S)
Noise	n=30 (85,7%)	n=35 (100%)	n=35 (100%)	
Knowledge of the risk of relapse (Yes)	n=35 (100%)	n=35 (100%)	n=35 (100%)	
Knowledge of behavior in relapse (Yes)	n=35 (100%)	n=35 (100%)	n=35 (100%)	
Knowledge of the risk of failure (Yes)	n=35 (100%)	n=35 (100%)	n=35 (100%)	
Knowledge of causes of failure (Yes)	n=35 (100%)	n=35 (100%)	n=35 (100%)	
Knowledge of prevention strategies (Yes)	n=35 (100%)	n=35 (100%)	n=35 (100%)	

4. Discussion and Conclusion

The purpose of this study was to produce and validate three patient communication and information tools ; a PowerPoint presentation , a video and a written brochure. The tools included General information on the definition of the orthodontic treatment, the means of diagnosis, the information of the patients on the diagnosis, the nature of the treatment, the fees and the duration of the treatment, as well as the explanation of the risks inherent to orthodontic treatment.

These tools were then evaluated through three groups (a) (b) and (c), of which each was given a different form to assess its reliability. This work comes to complete the study conducted in our care unit in April 2010, which has identified a real need for education and information of the patients on their orthodontic treatment and on the risks that may accompany it. Indeed, this study showed that the consent process works well regarding the diagnosis and the treatment plan. And much less concerning the knowledge of certain potential and sometimes irreversible risks, in particular the knowledge of the carious risk, the risk of necrosis, the risk of resorption and the risk of recession. Many of our patients were unaware of the risk of recurrence and the risk of failure of the orthodontic treatment.

The majority of our respondents (77%), preferred to consult the tools in Arabic. This suggests that it might be better to use these tools, while respecting the familiarity and sensitivity of the target population with regards to their mother tongue language, in order to facilitate communication of the message. The reliability of these tools was verified in two stages T1 and T2 after one month of the first phase of information T1, the results showed no statistically significant difference between the information during the short and the medium term ($p > 0, 05$). The results showed that all three tools significantly improved patients' knowledge levels. Nevertheless, for certain risks, audiovisual tools were better in terms of information efficiency. In other terms the effectiveness of audiovisual tools was much better with regards to certain potential risks, in particular the risk of gingival inflammation, gingival recession (100%), root resorption (65.7%) and joint sound (100%) with a statistically significant difference ($p < 0.05$).

Within same context, few studies have been conducted to validate the communication tools in the orthodontic treatment education. Moreover, several studies have evaluated the contribution of audiovisual tools to traditional information in the medical field, in order to determine the factors influencing patients' understanding. In this sense, a recent randomized controlled trial driven by Carter and Al. in 2022 aiming to compare the efficacy of 2 methods of delivering information for orthodontic patients, one by giving printouts with handwritten descriptions, and the

other via an audio-visual presentation (PowerPoint). Immediate and six-months Interviews of each group of patients were realized. At six-month follow-up, there were no significant differences between the two methods in terms of information retention and comprehension, and according to this trial, there is no better consent collection method to ensure that patient and parent information is preserved for months after starting treatment. (Carter, 2022).

Another randomized controlled trial was conducted by Ahn and al. (2019), to compare the effectiveness of three informative methods for short-term and long-term information recall for orthodontic patients and parents. In this trial, participants received an audiovisual presentation on orthodontic treatment by either leaflets, generic mind map, or participant's customized mind map. It was concluded that there was a small but significant improvement in information retention using mind maps compared to leaflets; and that there was no statistical difference between the type of mind map. And because of information recall degradation from short to long term in all groups, Ahn and al. suggested to repeat the information at follow-up appointments. (Hyun-baek, 2019)

A third study conducted in England by Patel J. et al (2008), aiming to determine the factors influencing the patients' recall of the information presented in different forms (PowerPoint and written brochures), the written information was a commercial flyer on orthodontic treatment which was produced by the British Orthodontic Society and was widely used in the UK and has been verified for better understanding for younger patients (Patel, 2008). The recall of the information was assessed using a short and long-term questionnaire. Age, gender, ethnicity, and the time taken to display or read the information were recorded. Variations in the participants' intelligence might also have an impact on children's understanding of information. The study showed that age was not an important factor affecting the retention of information, which is consistent with the results of our study, that showed good scores at all ages. This study showed that the recall of the information by the patients was better with the group informed using PowerPoint presentations with a percentage of 100% against 67.5% with the group informed using the flyer.

Results' analysis showed that the information tool was the only statistically significant factor in the short and longer term in each group, the mean scores were similar for both questionnaires, suggesting that time was not a major factor in the retention of information. Another study, conducted by Thomson et al which aimed the investigation on the degree of retention of the information on orthodontic treatment presented in 3 different forms (written, visual and oral), in the short and long term, using closed and open questions showed no statistically significant difference between the different groups as well as for the time factor, this is not consistent with the results of our study (Thomson, 2001). A multicenter, randomized, cross-sectional study published in 2016 by winter et al, that aimed the assessment of the contribution of video, media and portable media (PVM) in improving knowledge and satisfaction of patients during the consent process for cystoscopy and ureteral stent insertion in comparison with standard verbal communication (SVC) (Winter, 2016), showed a patients' preference for tools (PVM) in the consent process. PVM improves the patient's understanding of SVC and is considered an effective way to improve the knowledge acquired during the consent process which is consistent with the results of our study.

In another double-blind, randomized study by Dallimore et al, published in 2016, they compared satisfaction and recall of the information during physiotherapy rehabilitation sessions in patients who had hip surgery using two forms of information (Dallimore, 2016). The first group received information on the rehabilitation by means of an iPad and the second by a simple informative flyer. The study concluded that while both tools used have shown positive results on recalling the information and on patient satisfaction, the iPad remains the most effective tool for improving the understanding and the recall of the information and generated the most satisfaction ($p < 0.01$), which is consistent with the results of our study, compared to the multimedia tools that we used in particular the PowerPoint presentation, and the video.

In parallel, and regarding the education of health professionals, another recent study conducted by Kam et al (2016), aimed to compare the contribution of PVM means of communication with traditional information tools such as conferences and tutorials, during the educational training of nurse assistants for the surgical block (Kam, 2016). To achieve this goal, they conducted a multicenter, cross-controlled, randomized trial. The acquisition of

knowledge was collected by means of a questionnaire, and the satisfaction of the method of delivery of the education was measured using another satisfaction questionnaire.

The study concluded that MLP information provides a new and effective method for providing nurses with the information in surgical procedures, improves recall of knowledge, and is more satisfying for the candidates. Thus, the three tools i.e.: the written flyers, PowerPoint presentation and video have been satisfactorily effective in terms of informing and educating patients during the consent process, and can be considered as valid, reliable and practical tools in informing patients on the orthodontic treatment, its ramifications and its potential risks. Nowadays, patient's information is above all, a right and a practitioner's duty which implies serious legal responsibilities.

These studies showed that the information tool remains the most important factor to consider during the informed consent process. The use of other tools than the traditional written information including PowerPoint presentations, a video and the simple access to information via the internet by taking advantage of the growing explosion of Android devices in particular among the youngest patients, could improve the understanding and the recall of information, as well as the level of motivation and therefore reduce the anxiety among patients. This can be a significant strength, which will improve the level of cooperation of patients, much desired for the sole purpose of offering and providing a better quality of care.

In sum, the disclosure of information requires communication skills on behalf of physicians, and requires new abilities that will require special attention. In light of the reading of published scientific literature on this subject, it can be concluded that the present study has shown that the use of audiovisual tools in the patient education process has positive effects on the recall of information. The use of video and PowerPoint presentations lead to significantly better recall scores especially regarding some risks. The use of modern technology for patient's education and facilitating the access to information is becoming a must for a good service delivery. A controlled, randomized trial by Fraval et al, published in 2015 that compared the quality of informed consent obtained in patients who were candidates for surgery; using two methods, traditional verbal and web-based educational tools showed that using the web has improved knowledge (86%) and reduced anxiety among patients (60%) (Fraval, 2015). As orthodontic patient's education is a component that has the potential to affect the outcome of treatment, including the perception of the quality of the patient's therapy. Patient education must, therefore be designed to meet the needs of the patients and the demands of the treatment.

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References

- Baird and Kiyak. (2003). The uninformed orthodontic patient and parent: Treatment outcomes. *Am J Orthod Dentofac Orthop*. 5:124-212. DOI: 10.1016/s0889-5406(03)00400-1
- Carter, A., Al-Diwani, H. (2022). What is the best method to ensure informed consent is valid for orthodontic treatment? A trial to assess long-term recall and comprehension. *Evid Based Dent* 23, 52–53 . DOI: 10.1038/s41432-022-0272-9
- Dallimore RK, Leonin Asinas M, Chan D, (2016). A randomised double-blinded clinical study on the efficacy of multimedia presentation using an iPad for patient education of postoperative hip surgery patients in a public hospital in Singapore. *Singapore Med J* .28, 1–19. DOI: 10.11622/smedj.2016084

- Fournier C, Kerzanet S, (2007). Communication médecin-malade et éducation du patient, des notions à rapprocher: apports coirsés de la littérature. *Santé publique*. Vol.19.Issue 5 p : 413-425. DOI:10.3917/spub.075.0413
- Fraival A, Chandrananth J, Chong YM. (2015). Internet based patient education improves informed consent for elective orthopaedic surgery: a randomized controlled trial. *BMC Musculoskeletal Disorders* 6;16:283. DOI: 10.1186/s12891-015-0466-9
- Hyun-baek J. A., Power S, Thickett E, Andiappan M, and Newton T, (2019). Information retention of orthodontic patients and parents: A randomized controlled trial, *Am J Orthod Dentofac Orthop*, Vol 156 , Issue 2. DOI: 10.1016/j.ajodo.2019.03.017
- Kam J, Ainsworth H, Handmer M, Louie-Johnsun M, Winter M. (2016). Portable Video Media Versus Standard Verbal Communication in Surgical Information Delivery to Nurses: A Prospective Multicenter, Randomized Controlled Crossover Trial. *Evid Based Nurs*. DOI: 10.1111/wvn.12162
- Oudassi S., (2010). Le consentement éclairé en orthodontie. Thèse, Med Dent ; Casablanca,; n:79/10
- Patel JH, Moles DR, Cunningham SJ, (2008) Factors affecting information retention in orthodontic patients. *Am. J. Orthod. and Dentofac. Orthop.*;133:S61-7. DOI: 10.1016/j.ajodo.2007.07.019
- Richard C, Lussier MT, (2005) La communication professionnelle en santé. Québec : Éditions du nouveau pédagogique Inc, : p 840 . <https://doi.org/10.4000/communication.7513>
- Thomson AM, Cunningham SJ, Hunt NP, (2001) A comparison of information retention at an initial orthodontic consultation. *Eur J Orthod*;23:169-178. DOI: 10.1093/ejo/23.2.169`
- Winter M, Kam J, Nalavenkata S, (2016). The use of portable video media vs standard verbal communication in the urological consent process: a multicentre, randomised controlled, crossover trial. *BJU int*. DOI: 10.1111/bju.13595