

University of Business and Technology in Kosovo

UBT Knowledge Center

UBT International Conference

2020 UBT INTERNATIONAL CONFERENCE

Oct 30th, 8:30 AM - Oct 31st, 6:30 PM

International Conference on Dental Science

University for Business and Technology - UBT

Follow this and additional works at: <https://knowledgecenter.ubt-uni.net/conference>



Part of the [Dentistry Commons](#)

Recommended Citation

University for Business and Technology - UBT, "International Conference on Dental Science" (2020). *UBT International Conference*. 3.

<https://knowledgecenter.ubt-uni.net/conference/2020/2020booksofproceedings/3>

This Event is brought to you for free and open access by the Publication and Journals at UBT Knowledge Center. It has been accepted for inclusion in UBT International Conference by an authorized administrator of UBT Knowledge Center. For more information, please contact knowledge.center@ubt-uni.net.



Leadership and Innovation

Education | Research | Training | Consulting | Certification



PROCEEDINGS

9th UBT ANNUAL INTERNATIONAL
CONFERENCE

INTERNATIONAL CONFERENCE ON
DENTAL SCIENCE

30 - 31
OCTOBER

UBT Innovation
Campus



Proceedings of the
9th Annual International Conference

International Conference Dental Science

Edited by
Edmond Hajrizi

October, 2020

Conference Book of Proceedings

International Conference

Pristina, 30-31 October 2020

ISBN 978-9951-550-23-9

© UBT – Higher Education Institution

International Conference on Business, Technology and Innovation

Pristina, Kosovo 30-31 October 2020

Editor: Edmond Hajrizi

Organizing Committee: Edmond Hajrizi, Hasan Metin, Bertan Karahoda, Eda Mehmeti, Xhemajl Mehmeti, Betim Gashi, Murat Retkoceri, Sema Kazazi, Bejtush Ademi, Artan Mustafa, Mimoza Sylejmani, Violeta Lajqi - Makolli, Visar Krelani, Mirlinda Reqica, Besnik Qehaja, Anisa Rada, Safet Zejnullahu, Alisa Sadiku, Jorida Xhafaj, Albulena Ukimeraj, Vjollca Shahini, Arben Arifi, Aferdita Statovci, Cennet Lika, Visar Bunjaku, Valon Ejupi, Liburn Jupolli, Lirigzona Morina, Arbër Salihu, Artan Tahiri, Fitim Alidema, Deniz Celcima

Authors themselves are responsible for the integrity of what is being published.
Copyright © 2019 UBT. All rights reserved.

Publisher,
UBT

Editor Speech of IC - BTI 2020

International Conference is the 9th international interdisciplinary peer reviewed conference which publishes works of the scientists as well as practitioners in the area where UBT is active in Education, Research and Development. The UBT aims to implement an integrated strategy to establish itself as an internationally competitive, research-intensive institution, committed to the transfer of knowledge and the provision of a world-class education to the most talented students from all backgrounds. It is delivering different courses in science, management and technology. This year we celebrate the 19th Years Anniversary. The main perspective of the conference is to connect scientists and practitioners from different disciplines in the same place and make them be aware of the recent advancements in different research fields, and provide them with a unique forum to share their experiences. It is also the place to support the new academic staff for doing research and publish their work in international standard level. This conference consists of sub conferences in different fields: - Management, Business and Economics - Humanities and Social Sciences (Law, Political Sciences, Media and Communications) - Computer Science and Information Systems - Mechatronics, Robotics, Energy and Systems Engineering - Architecture, Integrated Design, Spatial Planning, Civil Engineering and Infrastructure - Life Sciences and Technologies (Medicine, Nursing, Pharmaceutical Sciences, Psychology, Dentistry, and Food Science),- Art Disciplines (Integrated Design, Music, Fashion, and Art).

This conference is the major scientific event of the UBT. It is organizing annually and always in cooperation with the partner universities from the region and Europe. In this case as partner universities are: University of Tirana – Faculty of Economics, University of Korca. As professional partners in this conference are: Kosova Association for Control, Automation and Systems Engineering (KA – CASE), Kosova Association for Modeling and Simulation (KA – SIM), Quality Kosova, Kosova Association for Management. This conference is sponsored by EUROSIM - The European Association of Simulation. We have to thank all Authors, partners, sponsors and also the conference organizing team making this event a real international scientific event. This year we have more application, participants and publication than last year.

Congratulations!

Edmond Hajrizi,

Rector of UBT and Chair of IC - BTI 2020

CONTENTS

In Vitro Effect of Etching Time And Polymerization Duration on the Shear Bond Strengths to Dentin	5
Xhevdet Aliu, Nexhmije Ajeti, Kastriot Meqa, Fisnik Aliu, Lumturije Asllani	5
Ethics in Clinical Research on Application of Virtual Articulators in Dentistry	9
Dugagjin Sokoli, Merita Barani, Burim Kiseri, Kujtim Shala	9

IN VITRO EFFECT OF ETCHING TIME AND POLYMERIZATION DURATION ON THE SHEAR BOND STRENGTHS TO DENTIN

Xhevdet Aliu, Nexhmije Ajeti, Kastriot Meqa, Fisnik Aliu, Merita Sveqla, Lumturije Asllani,
University for Business and Technology - UBT
University of Prishtina

Abstract: Some authors have used phosphoric acid in different concentrations and etching time for demineralization of tooth hard tissues (Buonocore, Bertolotti). In this study the *in vitro* effect of dentine etching time with phosphoric acid 37% (20 and 60 seconds) and composite polymerization duration (60 and 180 seconds) on the shear bond strengths to dentin was evaluated.

Materials and methods: The crowns of 32 extracted human molars were cut horizontally with diamond saw to gain larger surface of dentin. The working models were made of auto-polymerizing acrylate with the dentin layer, which was polished. Dentine was treated with 37% phosphoric acid in duration of 20 and 60 seconds, before the fourth generation adhesive (Syntac[®]) was applied. The control group used the fifth generation adhesive (AdheSe[®]). The composite was polymerized with two different durations (60 and 180 seconds). The samples stayed in water baths for 24 hours in 37°C. Shear bond strengths were measured with Instron machine. Data were analyzed with Anova and Tuckey test.

Results: Mean values of shear bond strengths for the first group (etching 20 sec / polymerization 60 sec) were 63.8 ± 3.7 N, for the second group (E 60 sec / P 60 sec) 111.7 ± 2.4 N, and for the third group (E 60 sec / P 180 sec) 132.8 ± 14.3 N. The control group (AdheSe[®]) had mean values 134.4 ± 15.5 N.

Conclusion: There is significant difference found between the second and the first group ($p < 0.019$) and between the third and fourth with the first group ($p < 0.001$). There is no significant difference between the second, third and fourth group.

Key words: Dentin's shear bond strength, etching time, polymerization.

Introduction

Since there is no direct connection of the composites to the tooth structure, a great number of adhesive systems have been developed to accomplish this bond. The foundations of the modern adhesives in dentistry were put in 1955, when Buonocore reported that acids can be used to modify the enamel's surface and make it "more acceptable for bonding".

Compared to the adhesive systems for enamel, dentin adhesive agents during last twenty years had turbulent history of development. Dentin's heterogeneous composition has made it a more difficult substrate to bond with adhesives than enamel. The smear layer that blocks dentinal tubules acts as a "diffusive barrier". This was initially thought to be beneficial in protecting the pulp decreasing dentin's permeability (Pashley DH et al. 1981). But, since the smear layer is only superficially bonded with the intact dentin's surface, there were poor results for the adhesives applied in this manner (Burke and McCaughey, 1995). The efforts to improve bonding strengths of adhesives to dentin led to introduction of primer solution of the third generation adhesive system in order to change the smear layer. In this generation, etching of dentin partially removed and/or modified the smear layer (Nakabayashi N, Pashley DH, 1998). The complete removal of the smear layer was achieved in the adhesive systems of the fourth generation. The era of today's adhesive systems in the USA has begun by the end of the 1980s when the total etch concept was introduced, based on the work of Fusayama and others in Japan. Ray Bertolotti and John Kanca in 1991 proposed application of the phosphoric acid to etch enamel and dentin simultaneously. In the fourth generation of the adhesive systems the smear layer is removed completely using organic acids, and is followed by formation of a hybrid layer when primer and adhesive is used (Nakabayashi et al. 1992, 1995), thus achieving stronger bond. The unsuccessful bonding to dentin covered with smear layer before 1990 was due to inability of resins to go through this layer (Tao L, Pashley DH, Boyd L, 1988). In order to alleviate clinical use, one-bottle systems have combined primers and adhesives in one solution, applied after simultaneous enamel and dentin etching (total etch, wet bonding) with 35-37% phosphoric acid for 15-20 seconds (Ferrari M et al. 1997). These systems represent mixture of hydrophilic and hydrophobic resins in diluents, such as acetone, ethanol and water. These adhesive systems create a mechanism of mechanical bonding of the etched dentin with dentin tags, with lateral adhesive branches, and thus creating a hybrid layer which showed higher values of shear bond strengths to enamel and

dentin (Tay FR et al. 1994). Watanabe and Nakabayashi in 1993 have developed a self-etching primer, which is water solution of 20% phenyl-P in 30% HEMA, simultaneously bonding both dentin and enamel.

The combination of steps of etching and priming reduces working time, eliminates the rising of the acids` gel and avoids the collagen collapse. Bot the self-etching primer has some cons, e.g. the solution has to be refreshed continuously, because the composition of the solution cannot be controlled (Ferrari et al. 1997) and often here is still smear layer left between the adhesive and dentin (Nakabayashi et al. 1998).

Toida et al. (1995) advised that the removal of the smear layer with a separate step of etching before the bonding would produce stronger and sustainable bond to dentin. Tests of the shear bond strengths *in vitro* often didn`t show significant differences between one-bottle systems and adhesives with sel-etching primers. *In vitro* and clinical microleakage tests showed that one-bottle systems produced better sealing with dentin margins than self-etching systems (Ferrari M, Manocci F, 1997).

Al-Ehaideb et al. (2000) studied shear bond strengths to dentin of five one-bottle self-etching systems. Blomlof et al. (2001) compared action of 32% of phosphoric acid in 15 seconds and EDTA 24% in 3 minutes. Cederlund et al. (2001) treated dentin with EDTA 24% in 30, 60, 120 and 240 seconds. Abu-Hanna and Gordan (2004) evaluated the impact of etching time with phosphoric acid (5, 15 and 30 seconds) in bonding strengths to dentin. Erhardt et al (2004) used phosphoric 37% in 15 seconds.

Lately, adhesive systems have developed further, and a sixth generation is proposed. Those systems have the possibility of achieving a proper bonding to enamel and dentinusing only one solution. The materials of this generation should be used in a single step. Unfortunately, initial evaluations of these new systems showed sufficient bonding to dentin, but had less effective bonding to enamel. This is due to acidic content of the sixth generation adhesive systems.

According to data on polymerization of the composites, until now, it has been proved that the thickness of composites and the duration of polymerization have impact on the composites` solidity. No doubt that this is one of key factors of composite bonding to dentin (Sustaric et al. 1994). According to this investigation, it is confirmed that the solidity of the composites between the top and bottom layer (surface in contact with dentin) is not the same.

The aim of this study was to test the *in vitro* shear bond strength of composites to dentin after etching with phosphoric acid 37% with 20 and 60 seconds durations and with different polymerization durations (60 and 180 seconds).

Material and methods

For this study were used 32 fresh intact molars extracted for orthodontic purposes, with complete crown. The teeth were immersed in sterile saline, washed and cleane with brush and paste. The crowns were cut horizontally using Isomet 1000 Precision Saw (Buegler Ltd) in the “Joze Stefan” Institute in Ljubljana, Slovenia.

The prepared tooth faced a quartz plate with its dentin surface and around was placed a quartz cylinder (O 15). The cylinder was filled with autopolymerizing resin (Probase Cold, Ivoclar, Lichenstein). In order to have precise results, the dentin surface was planned and polished using polishing machine (Pendex-2, Denmark) from the same Institute. Samples were prepared in the scientific-research laboratory of the Dentistry School of University of Ljubljana, Slovenia.

The samples were randomly placed in four groups of eight.

The first three groups were used to test the adhesion of the Syntac system depending on the dentin etching time and polymerization duration of the composite, and the fourth group was used as a control using AdheSe system.

In the first group dentin was etched in 20 seconds and polymerization duration 60 seconds. The second group had 60 seconds of etching and same polymerization time as the first group. The third group had same etching time as the second group and polymerization 180 seconds. The fourth group used fifth generation of adhesive system (AdheSe) with polymerization of the composite of 60 seconds. The composite used in all groups was Tetric Ceram (Vivadent, Lichtenstein).

After the removal of the plastic ring used during polymerization, the workin mode was ready to be tested for shear bond strength. The models were immersed in distilled water in 37C for 24 hours. The composites bonding to dentin was determined using the test of shear bond strength based on the standard ISO TR 11405/1994.

Shear bond strength was tested using Instron Testing Maching (Instron 4301) in “Joze Stefan” Institute, in Ljubljana, Slovenia. The results were expressed in Newton (N).

The statistical analysis were done using one way analysis of variance (ANOVA) and Tuckey test.

Results

The testing of the shear bond strengths of the composite to dentin showed the following results:

- The first group had mean bond strength 63.8 +- 3.7 N
- The second group the strength was significantly higher with mean 111.7 +- 2.4 N\
- The third group had mean strength 132.8 +- 14.3 N.
- The fourth group had the highest mean shear bond strength – 134.4 +- 15.5 N\

The one way analysis of variance, used to compare the mean vaues between the tested groups and resulted with significant statistical difference (p<0.001).

Source of Variation	DF	SS	MS	F	P
Between groups	3	25995.6	8665.2	9.4	<0.001
Residual	28	25934.5	926.2		
Total	31	51930.1			

In order to determine the significant difference between groups, multiple comparison with Tukey test was used. From this analysis we fond significant difference between the second and the first group (p<0.019) and between groups three and four with the first group (p<0.001, respectively).

No significant difference was found between the third and second, fourth and second and fourth and third group.

Comparison	Diff of means	p	q	Significance P
Gr II vs Gr I	47.93	4	4.45	< 0.019
Gr III vs Gr I	69.00	4	6.41	< 0.001
Gr IV vs Gr I	70.57	4	5.56	< 0.001
Gr III vs Gr II	21.08	4	1.96	> 0.519
Gr IV vs Gr II	22.65	4	2.11	> 0.458
Gr IV vs Gr III	1.57	4	0.15	> 1.0

Conclusion

Based on the results, we can conclude that with longer etching time of dentin with phosphoric acid 37%, as well as longer duration of composite polymerization the shear bond strengths of composite with dentin is increased.

References

1. Abu-Hana A, Gordan W. Evaluation of etching time on dentine strength single bottle bonding systems. J Adhesiv Dent.2004; Summer;6(2):105-10.
2. Ali Al-Ehaidep; Shear bond strength of one bottle dentine adhesives;J Prosthet Dent 2000;84:408-12.
3. Bertolotti R.L. Total –etch –The rational dentin bonding protocol. J Esthet Dent 1991;3:1-6
4. Buonocore M.G.,A simple method of increasing the adhesion of acrylic filling materials to enamel surface ,I Dental Res 1955;Dec;34(6);849-53.
5. Burke F.J.,McCaughy A.D., The four generations of dentin bondig.Am J Dent .1955;Apr;8(2);88-92.
6. Cederlund A .Shear strengts after EDTA conditioning of dentin.Acta Odontologica Scandinavica 2001;12;418-422.
7. Erhard MC, Cavalcante LM,Pomenta LA. Influence ortiphosphoric acid pretreatment on self etching bond strength. J Estet Dent.2004;16(1):33-40.

8. Ferrari M, Goracci G, Garcia-Godoy F. Bonding mechanism of three one –bottle systems to conditioned and unconditioned enamel and dentin. *Am J Dent* 1997 Oct;10(5):224-30.
9. Nakabayashi N, Pashley DH. *Hybridization of dental hard tissue*. Tokyo Quintessence. 1988.
10. Pashley DH, Michelich V, Kehl T. Dentin permeability: effect of smear layer removal. *J Prosthet Dent*. 1981 Nov;46(5):531-7.
11. Sustercic D. *Ucinek erbijvega lasera na zobno sklenino in dentin*; Doktorska disertacija, Ljubljana, 2003.
12. Tay F.R, Gwinet A.J, Pang K.M, Wei S.H. Structural evidence of a sealed tissue interface with a total – etch wet-bonding technique in vivo. *J Dent Res*. 1994 Mar;73(3):629-36.
13. Tao L, Pashley D.H, Boyd L. Effect of different types of smear layers on dentine and enamel shear bond strengths. *Dental Materials* 1988;4:208-216.
14. Toida K, Watanabe A, Nakabayashi N. Effect of smear layer on bonding to dentin prepared with bur. *J D Mater* 1995 ;14:109-16.33.
15. Watanabe I, Nakabayashi N. Bonding durability of photocured phrnyl-P IN TEGDMA To smear layer-retained bovine dentin. *quintessence Int*. 1993 May;24(5):335-42.

Ethics in Clinical Research on Application of Virtual Articulators in Dentistry

¹Dugagjin Sokoli, ¹Merita Barani, ¹Burim Kiseri, ²Kujtim Shala

¹UBT College, Faculty of Dentistry, Prishtina, Kosovo

²University of Prishtina “Hasan Prishtina”, Prishtina, Kosovo

dugagjin.sokoli@ubt-uni.net

Abstract: Just like any other medical research field, the investigation on the use of virtual articulators in dentistry has its ethical implications. Research ethics in oral and medical investigations are critical internationally. The privacy of any participant in the research is a non-negotiable and justice is crucial at all times during the research. We researched on various online research platforms and selected 12 research papers, out of 197, that treat the ethics in research in medical and dental clinical research. We identified 10 ethical issues that needs to be considered while doing clinical research on application of virtual articulators in dentistry. Those are: (1) Duty to society; (2) Beneficence; (3) Conflict of interest; (4) Informed consent; (5) Integrity; (6) Nondiscrimination; (7) Nonexploitation; (8) Privacy and confidentiality; (9) Professional competence; and (10) Professional discipline. Research ethics is a sensitive topic either when discussing human rights, the integrity of research, or conflict of interest. Research ethics, a wholesome practice, and preparation are crucial. Given that the research on the use of virtual articulator in dentistry is crucial to dental health around the globe, the studies should be of high accuracy. The research findings should be published fully, avoiding any form of plagiarism. Integrity is critical in any scientific research. Integrity builds the reputation of a research and the researcher involved. Peer reviewing is an appropriate measure to deal with integrity. It is where different professionals analyze and post their views on published research, confirming its credibility.

Keywords: Ethics in research, virtual articulator, dentistry, professional integrity, professional credibility

Introduction

Just like any other medical research field, the investigation on the use of virtual articulators in dentistry has its ethical implications. Research ethics in oral and medical investigations are critical internationally. “Some of the common international governing laws include respect for humanity, and one is the need for consent and voluntary independence” [1]. Also, vulnerable individuals should be respected. The privacy of any participant in the research is a non-negotiable and justice is crucial at all times during the research. The research needs to produce more benefits than disadvantages for it to be a successful one. Any participant should be aware of the possible effects of the research, either positive or negative. The research project should always have a sound scientific aim and standardized care regulations are crucial for research. This paper’s aim is to investigate the ethics in research on the use of virtual articulator in dentistry. Conducting such a research requires high discipline to follow the set of ethical standards governing the sector. Ethical principles are mainly to safeguard human rights, and they are independent of where the research is situated.

During the research on Springer Link, Pro Quest, Science Hub, Science Direct and Google Scholar, I have selected the 12 research papers, out of 197, that treat the ethics in research in medical and dental clinical research. Since the research topic involves human participants, ethical issues always arise from such [2]. The following are ethical principles that apply in the investigation on the use of Virtual Articulator in Dentistry.

Duty to Society

Every researchers and research must contribute to the well-being of society. The primary premise of duty to society is that research must not be undertaken if it produces no benefit to society. Such benefit is judged by the researchers, their institution, and their sponsors, rather than by society as a whole or by historians in future decades, leading to lapses between what researchers and the research community believe is a benefit to society and what other members of society might believe.

Some unethical activities conducted in the name of medical research involved the inhumane treatment of research participants without a broader benefit to society or with benefits that could not have been foreseen at the time. In some cases, duty to society comes in conflict with beneficence, as when society may benefit from research that may knowingly and intentionally harm research participants.

In modern ethics, both beneficence and duty to society are simultaneously required: Research must benefit or aim to do no harm to both the research subjects and society. There is no universal equilibrium, since some cultures place more emphasis on the well-being of a community over that of the individual.

In medical disciplines, the literature states that the primary obligation of researchers should be to their participants, not to the objectives of their studies. This principle was documented in the first version of the Declaration of Helsinki in 1964, which said, “clinical research cannot legitimately be carried out unless the importance of the objective is in proportion to the inherent risk to the subject”.

Research in virtual articulators will improve overall satisfaction of patient with better measurement, hence there is a direct benefit to society.

Beneficence

Researchers should have the welfare of the research participant in mind as a goal and strive for the benefits of the research to outweigh the risks. Beneficence is a core tenet of any research that involves human participants, and, as such, it could be called a pillar of medical research. Simply put, beneficence requires that research be designed to maximize the benefits to research participants while minimizing the harm to them. According to the literature, the benefits of the research may not be artificially inflated by researchers to disguise the harms nor to offset the severity of the harms. In other words, any financial or nonfinancial benefits offered to research participants, including payment for participation, free medical tests, free medical exams, free vaccinations, and so on, cannot be considered in an assessment of beneficence.

In medicine, adherence to the principle of beneficence reconciles the tensions between the responsibility to provide a quality of care and the need for research to test new treatments by requiring researchers to hold the welfare of the research participant to the highest standards.

In clinical contexts, as opposed to research contexts, a physician is expected to be guided by both beneficence and the complementary concept of avoiding harm (nonmaleficence). Because research involves more uncertainty than clinical care, reducing uncertainty is a goal of research, it is understood that there is a risk of harm, which should be outweighed by the potential for benefit.

Patients that are part of research on virtual articulators will only benefit from new technology that will enable them to have better fitting dentures.

Conflict of Interest

Conflict of interest is another research ethics in the investigation. This research is purely not meant to benefit select individuals. The study should be trustworthy from all angles. The research should not target any vulnerable groups or individuals. It is a common occurrence for students pursuing dentistry to participate in investigations involving oral health.

Other participants are also mostly those individuals that may benefit directly from the research, like colleagues. It profoundly depicts a conflict of interest. Therefore, the study can avoid any of that through transparency. An external partner can be involved to foresee the process of choosing subjects in the research (3).

Conflict of interest is the primary influence of extra personal attention on a professional decision. These interests include discrimination or financial issues, and they may compromise the legitimacy of the research. With the conflict of interest, the scientific part of it loses a lot as the investigation aims to serve personal incentives.

It also affects the level of vigilance that the research is crucial to produce the best results. External advisors are efficient in checking any conflict of interest in the study. The best way to deal with this is first to declare any possible conflicts of interest in the initial proposal. It serves as a guide, as the research details are available (4).

Researchers should minimize financial and other influences on their research and on research participants that could bias research results. Conflict of interest is more frequently directed at the researcher, but it may also involve the research participants if they are provided with a financial or nonfinancial incentive to participate.

The literature documents how conflicts of interest can be financial or nonfinancial (including the provision of equipment, services, speaking and publishing opportunities, professional opportunities, or any other personal gain to the researcher). Codes of conduct that discuss conflicts of interest place responsibility on researchers to prevent and/or disclose any such relationships. Many journals require such disclosure of support for their research from authors prior to accepting articles for publication. For research participants who are paid for their participation, the payment itself, as well as any nonmonetary benefits of participating, can create a conflict in preventing the participant from accurately weighing the risks and benefits of the research.

Informed Consent

All research participants must voluntarily agree to participate in research, without pressure from financial gain or other coercion, and their agreement must include an understanding of the research and its risks. When participants are unable to consent or when vulnerable groups are involved in research, specific actions must be taken by researchers and their institutions to protect the participants. Informed consent may be one of the best-defined ethical elements across our research. Every discipline we examined that uses human research participants agrees on the need for informed consent, and we found few variations in how it should be applied.

In dental/medical clinical trials, informed consent:

- Must use language the research participant understands and comprehends to explain the research, its risks to the participant, and its benefits to the participant.
- Must be given freely by the research participant.
- May be revoked by the research participant at any time.
- May only be asked of and given by adults who are capable of making an informed consent, and when research participant are neither adults nor capable of making an informed consent, review boards should provide oversight to protect the rights of research participants, which could involve engaging surrogates or proxies (who raise their own issues).

All patients taking part in this research will be informed and will sign the consent form only after confirming that they understand all what this research is about, and that there is no harm whatsoever for the patient

Integrity

The integrity of the researcher is also a research ethic. It is closely related to conflict of interest. Conflict of interest compromises the integrity of the researcher and the research itself. It is a responsibility to ensure that the study is of high integrity. It involves issues such as utilization of funds, use of research methods, analysis of results, and referencing or citation.

The most common causes that lead to a breach of the integrity of a research include the following. One is the urge for one to track their career fast. It is common in almost any field of study, and it should be a red flag to the integrity of the research. Given the research is a life-changing phenomenon and personal gain can be a hindrance to its success (5).

All research methods or strategies should be present and accessible to any interested party and should be accurate. Other issues like personal gain and unnecessary competition lead to dishonest activities like publishing false results. An individual or research team can also withhold data for personal gain.

Researchers should demonstrate honesty and truthfulness. They should not fabricate data, falsify results, or omit relevant data. They should report findings fully, minimize or eliminate bias in their methods, and disclose underlying assumptions.

The most frequently discussed aspect of integrity is the importance of honest and truthful reporting of results. These principles entail avoiding plagiarism and falsification of data and results and striving to remove bias from research methods and analysis.

Another important component of integrity lies in conforming to ethical rules in applying placebo and deception in research. Using a placebo as an alternative to the experimental treatment is accepted only when no current proven intervention exists, or participants will not be subject to irreversible harm.

Plagiarism is another issue with research findings. A researcher may want to copy the findings of another research. The international media is keen to highlight any cases of dishonesty in any scientific research (6).

Nondiscrimination

Major ethical issue is safeguarding the safety of the participants in the research (7). International bodies mostly dictate regulations on participant safety. "Failure to comply leads to dismissal of the research no matter how productive it is." Human security comes first at all times. Research involving human participants is essential if it produces more advantages than disadvantages.

Before the research proceeds, the proposal of the study is necessary to provide guidelines through the process. An individual ethics board is useful to highlight the proposal details. The proposal should outline how the research is inclined to protect the safety of all human participants. It is regardless of the size of the role that the relevant participants play. The above review of the proposal is, therefore, necessary, and it is a crucial responsibility for the project team. After the local report, it is further forwarded to relevant authorities to provide the green light for the project. It might elongate the project time, but it is a requirement (7).

Researchers should minimize attempts to reduce the benefits of research on specific groups and to deny benefits from other groups. The principle of nondiscrimination seeks to guarantee that human rights are exercised without discrimination of any kind based on race, color, sex, language, religion, political or other opinion, national or social origin, property, birth or other status such as disability, age, marital and family status, sexual orientation and gender identity, health status, place of residence, economic and social situation.

One approach to nondiscrimination is fair subject selection. It is defined as the selection of subjects so that stigmatized and vulnerable individuals are not targeted for risky research and the rich and socially powerful not favored for potentially beneficial research.

The APA says that "Psychologists recognize that fairness and justice entitle all persons to access to and benefit from the contributions of psychology and to equal quality in the processes, procedures, and services being conducted by psychologists."

The use of virtual articulator in dentistry requires human participants. It is because it involves the design, manufacture, and fitting of artificial replacements for teeth and other parts of the mouth. The technology also directly affects the recipients of these parts; therefore, human safety is essential. Failure to observe social safety leads to immediate or future complications, which is detrimental to the quality of the research (8).

Respect for human rights is not just about the safety of human participants, as is also about maintaining fairness and justice during the research at all times. The study should strike a balance between the benefits and the risks. (9) The participants should face fewer risks while getting benefits from the project. In the use of virtual articulator in dentistry, participants get a lot of benefits, as the technology aims to solve problems associated with artificial teeth replacements. It also saves time, as it is faster than the old way of making such replacements (9).

Nonexploitation

Researchers should not exploit, or take unfair advantage of, research participants. Exploitation exists when there is unequal distribution of the burdens or benefits of research, particularly when research is conducted on categories of patients made vulnerable by impairment, institutionalization, or economic conditions and who are likely to bear only its burdens. Exploitation may occur when a population is singled out for recruitment as research participants, bears the full risks of the research, or does not enjoy the benefits of the results, and historically this includes research with racist or other prejudicial motivations.

Vulnerable people participating in the research must provide their consent before proceeding as their interests and privacy are non-negotiables. Vulnerable people include children, the poor, or the elderly, and they are one of the highest targeted cases in this research. Consent from these people is a necessity, and further approval from relevant authorities is required.

The vulnerable can also include those people who do not have medical insurance and those without knowledge about research ethics and regulations. Their consent also matters, and according to research, it shows that they are among those profoundly affected by dental health. Such people are most likely unable to understand the importance of consent; therefore, it is vital to understand it as an ethical issue (10).

Privacy and Confidentiality

Definition of privacy states that: “Research participants have the right to control access to their personal information and to their bodies in the collection of biological specimens. Participants may control how others see, touch, or obtain their information.”

Definition of confidentiality states that: “Researchers will protect the private information provided by participants from release.” Confidentiality is an extension of the concept of privacy; it refers to the participant’s understanding of, and agreement to, the ways identifiable information will be stored and shared.

According to the Declaration of Helsinki, every precaution must be taken to protect the privacy of research subjects and the confidentiality of their personal information. Privacy and confidentiality apply to research that uses human participants or data about humans. The privacy issues raised in the literature center on the management of research participants’ information. It begins with the protocols that the scientific community should follow to ensure against the disclosure of personal or confidential information. These include de-identifying personal data, encrypting it (along with the codes used to link identities), limiting access to a minimum number of people, and planning for how confidentiality will be maintained when information is shared among sponsors, collaborators, or coinvestigators.

Professional Competence

Researchers should engage only in work that they are qualified to perform, while also participating in training and betterment programs with the intent of improving their skill sets. This principle includes choosing appropriate research methods, statistical methods, and sample sizes to avoid misleading results.

Across disciplines, professional competence is described as an ethical principle that presupposes that researchers are trained in and using appropriate research methods. Additionally, this ethical principle suggests that researchers adhere to appropriate safety standards when conducting their research. Professional competence places the responsibility on the researchers to have such knowledge, training, and awareness. It does not allow ignorance of certain research methods or research practices due to lack of training or awareness to act as a justification for noncompliance.

Professional Discipline

Researchers should engage in ethical research and help other researchers engage in ethical research by promoting ethical behaviors through practice, publishing and communicating, mentoring and teaching, and other activities. Professional discipline relates to how a researcher adheres to ethics; how a researcher promotes ethics, including through mentoring and training other researchers and acting as a reviewer for other researchers’ studies; and how a researcher enforces ethics, including by conducting peer review of research submitted through publication and other activities. Professional discipline implies the internalization of ethical principles and their external expression in behavior across the board. It requires researchers to do their research and related activities ethically, and it encourages sponsoring agencies and professional outlets, such as societies or journals, to enforce ethical practice. In some cases, codes of conduct differentiate between professional discipline (researchers should promote ethical practice within their discipline) and adherence to code (researchers should themselves practice ethically). In this report, we combine principles.

Conclusion

Research ethics is a sensitive topic either when discussing human rights, the integrity of research, or conflict of interest. Research ethics, a wholesome practice, and preparation are crucial. Highlighting essential research ethics at the beginning is vital to avoid any of them. Research is only meaningful when fundamental ethical values are present. It is also critical to ensure that the study brings more benefits than disadvantages.

Given that the research on the use of virtual articulator in dentistry is crucial to dental health around the globe, the study should be of high accuracy. The research findings should be published fully, avoiding any form of plagiarism. There is a global problem of false or copied research findings. The internet is an open-source tool, and this information reaches a lot of people who use it unknowingly, making it easier to publish research findings online. It increases the rate of false information online (7).

Integrity is critical in any scientific research. Integrity builds the reputation of a research and the researcher involved. Peer reviewing is an appropriate measure to deal with integrity. It is where different professionals analyze and post their views on published research, confirming its credibility. It is a standardized regulation not only in medical research but in other fields too. It is common in government-controlled portals (8).

References

1. Rudra P, Lenk C. Process of risk assessment by research ethics committees: foundations, shortcomings, and open questions. Available from the Journal of Medical Ethics. 2020[cited 2020 March 10];1(1):medethics-2019-105595. doi:10.1136/medethics-2019-105595
2. Torous J, Nebeker C. Navigating Ethics in the Digital Age: Introducing Connected and Open Research Ethics (CORE), a Tool for Researchers and Institutional Review Boards. Available from the Journal of Medical Internet Research. 2017 [cited 2020 March 10];19(2):e38. doi:10.2196/jmir.6793
3. M K. Survey of Dental Caries Among Students in Junior High School in Shiraz. Available from the International Journal of Dentistry and Oral Science. 2016 [cited 2020 March 10];1(1):336. Doi: 10.19070/2377-8075-1600067
4. Nikravanfard N, Khorasanizadeh F, Zendehelel K. Research Ethics Education in Post-Graduate Medical Curricula in I.R. Iran. Available from Developing World Bioethics. 2016 [cited 2020 March 10];17(2):77-83. Doi: 10.1111/dewb.12122
5. Bracken-Roche D, Bell E, Macdonald M, Racine E. The concept of ‘vulnerability’ in research ethics: an in-depth analysis of policies and guidelines. Available from the Health Research Policy and Systems. 2017 [cited 2020 March 10];15(1). Doi: 10.1186/s12961-016-0164-6
6. Recent Trends of 3-D Printing in Dentistry - A review. Available from the Annals of Prosthodontics and Restorative Dentistry. 2016 [cited 2020 March 10];2(4):101-104. Doi: 10.18231/2455-8486.2016.0001
7. Master Z, Martinson B, Resnik D. Expanding the Scope of Research Ethics Consultation Services in Safeguarding Research Integrity: Moving Beyond the Ethics of Human Subjects Research. Available from the American Journal of Bioethics. 2018 [cited 2020 March 10];18(1):55-57. doi:10.1080/15265161.2017.1401167
8. Garrocho-Rangel A, Cerda-Cristerna B, Pozos-Guillen A. Bioethical Issues in Conducting Pediatric Dentistry Clinical Research. Available from the Journal of Clinical Pediatric Dentistry. 2018 [cited 2020 March 10];42(2):85-90. Doi: 10.17796/1053-4628-42.2.1
9. Sarkis-Onofre R, Cenci M, Moher D, Pereira-Cenci T. Research Reporting Guidelines in Dentistry: A Survey of Editors. Available from the Brazilian Dental Journal. 2016 [cited 2020 March 10];28(1):3-8. Doi: 10.1590/0103-6440201601426
10. Master Z, Martinson B, Resnik D. Expanding the Scope of Research Ethics Consultation Services in Safeguarding Research Integrity: Moving Beyond the Ethics of Human Subjects Research. Available from the “The American Journal of Bioethics”. 2018 [cited 2020 March 10];18(1):55-57. doi:10.1080/15265161.2017.1401167
11. K, N, E. Oral Health Behaviors and Attitudes using the Modified Arabic Version of Hiroshima University – Dental Behavioral Inventory (HU-DBI) among Sudanese Dental Students. Available from the International Journal of Dentistry and Oral Science. 2016 [cited 2020 March 10];326-330. Doi: 10.19070/2377-8075-1600065
12. Joda T, Waltimo T, Probst-Hensch N, Pauli-Magnus C, Zitzmann N. Health Data in Dentistry: An

Attempt to Master the Digital Challenge. Available from the Public Health Genomics. 2019 [cited 2020 March 10];22(1-2):1-7. Doi: 10.1159/000501643

Katalogimi në botim (CIP)
Biblioteka Kombëtare e Kosovës "Pjetër Bogdani"

616.311(496.51)"2019"(062)

International Conference Dental Science : Proceedings of the 9th Annual International Conference / edited by Edmond Hajrizi. - Prishtinë : UBT, 2020. - 16 f. : ilustr. ; 30 cm.

Stomatologjia -- Konferencë -- 2019 -- Kosovë -- Dhëmbët -- Sëmundjet

ISBN 978-9951-550-23-9

Aleph [000098102]

INTERNATIONAL CONFERENCE ON BUSINESS, TECHNOLOGY AND INNOVATION

CHAPTERS:

- Computer Science and Communication Engineering
- Management, Business and Economics
- Mechatronics, System Engineering and Robotics
- Energy Efficiency Engineering
- Information Systems and Security
- Architecture - Spatial Planning
- Civil Engineering, Infrastructure and Environment
- Law
- Political Science
- Journalism, Media and Communication
- Food Science and Technology
- Pharmaceutical and Natural Sciences
- Design
- Psychology
- Education and Development
- Fashion
- Music
- Art and Digital Media
- Dentistry
- Medicine & Nursing
- Sports, Health and Society
- Security Studies
- Language and Culture

Lagjja Kalabria p.n KS - 10000, Prishtinë

+383 38 541 400

+383 38 542 138

ISBN 978-9951-550-23-9



www.ubt-uni.net

conferences@ubt-uni.net

