CONFERENCE PROGRAM

and

ABSTRACTS

Póvoa de Varzim

Portugal

CONFERENCE PROGRAM

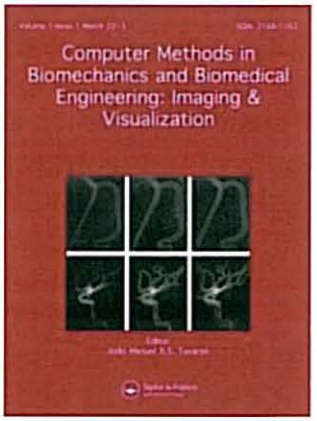
inegi driving innovation

Taylor & Francis

Póvoa de Varzim
CÂMARA MUNICIPAL

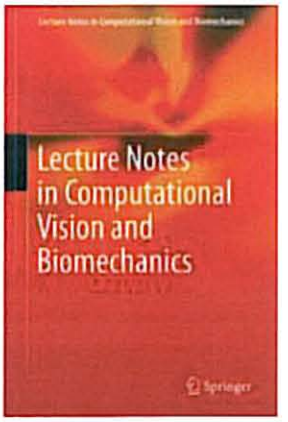
idmec

Springer
the language of science



LABORATÓRIO DE BIOMECÂNICA DO PORTO

U.PORTO



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Renato Natal Jorge
Reis Campos
Mário Vaz
Sónia Santos
João Manuel R. S. Tavares

III INTERNATIONAL CONFERENCE ON BIODENTAL ENGINEERING

PORTO - PORTUGAL
22 - 23 JUNE 2014

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Yongjie (Jessica) Zhang

VENUE

AxisVermar Conference & Beach Resort
Rua da Imprensa Regional s/n
4490-518 Póvoa de Varzim

http://www.axishoteis.com/en/Axis-Hotels/Hotels/Axis-Vermar/The-Hotel.aspx

GPS Coordinates:
Latitude: 41° 23' 29.62" N
Longitude: 8° 46' 21.99" W

Telf.: +351 252 298 910

Wi-Fi:

Network: Hotel Axis Vermar

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U.PORTO FACULDADE DE MEDICINA DENTÁRIA UNIVERSIDADE DO PORTO

Saturday	
17:00	**Registration**
18:30	**Welcome reception**

WELCOME RECEPTION

AxisVermar Conference & Beach Resort
Rua da Imprensa Regional s/n
4490-518 Póvoa de Varzim

http://www.axishoteis.com/en/Axis-Hotels/Hotels/Axis-Vermar/The-Hotel.aspx

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Sunday (Room: 'Auditório')	
08:00	**Registration**
08:30	**Open session**
09:00	**Oral presentations – Session I** Chairpersons: Mário Vaz / Fernanda Gentil Occlusal splint vs. anterior deprogrammer in bruxism therapy – is surface electromyography a valid tool? Bartosz Dalewski, Bogumiła Frączak The use of GBR in bone regeneration: a histologic study in the rabbit model Isabel Guerra, Helena Figueiral, Mário Vasconcelos, José Reis Campos, Fernando Branco, Américo Afonso, Raquel Zita Gomes Time dependent Constitutive model for a biopolymer derived from Castor Oil Polyurethane André Vieira, Romeu Cavalcante da Costa, Rui M. Guedes, Volnei Tita Computer-aided design and manufacturing of dental implants with irregular geometries Jianyu Chen, Xianshuai Chen, Xiao Zhang, Feilong Deng, Zhiguang Zhang, Olaf Eichstädt, Ruxu Du Automatic reconstruction of dental CT images using optimization Paulo H.J. Amorim, Rui B. Ruben, Thiago Franco Moraes, Jorge V.L. Silva, Helio Pedrini Effect of repeated tightening and loosening cycles of prosthetic screws in the micromovements of the abutment-implant assembly: a pilot study Ana Messias, Salomão Rocha, Nuno Calha, Fernando Guerra, Maria Augusta Neto, Pedro Nicolau
10:30	***Coffee break***

Sunday (Room: 'Auditório')

Oral presentations – Session II

Chairpersons: Maria Helena Figueiral / João Manuel RS Tavares

11:00

The CAD technology in removable prosthodontics
Manuel Sampaio-Fernandes, Margarida Sampaio-Fernandes, Patrícia Fonseca, Paulo Almeida, Maria Helena Figueiral

Design and synthesis of novel bilayered scaffolds for periodontal tissue regeneration
Ourania-Menti Goudouri, Ulrich Lohbauer, Rainer Detsch, Eleana Kontonasaki, Aldo R. Boccaccini

Ideal spacing according to different types of cement – Everest system (KAVO®)
Paulo Rocha Almeida, Paulo Meireles Caniço, César Leal, J.C. Reis Campos, João Sampaio-Fernandes

Analysis of autoclave induced dimensional changes on addition silicones
Manuel Só, Orlando Lino, Paulo Rocha Almeida, César Leal, J.C. Reis Campos, João Sampaio-Fernandes

Cyclic fatigue resistance of five rotary endodontic instruments
Borja Chaveli-Díaz, Leopoldo Forner, Carmen Llena, Rui Madureira, Fausto Tadeu

Clinical trial – In vivo endosseous implants micromovements measuring with 3D digital image correlation method
Tânia Rodrigues, Filipe Moreira, Augusta Neto, Fernando Guerra, Pedro Nicolau

Effects of micromovement on the strain distribution of an implant supported zirconia dental bridge structure during loading: a 3D digital image correlation and 3D finite element analysis
Nuno Calha, Tânia Rodrigues, Ana Messias, Luis Roseiro, Pedro Nicolau, Maria Augusta Neto

13:00 ***Lunch (Restaurant ground floor)***

Sunday (Room: 'Auditório')

Oral presentations – Session III

Chairpersons: Henrique Almeida / João Sampaio-Fernandes

14:00

Relationship between implant primary stability (Torque and ISQ) and bone density assessed by CBCT- clinical trial
Raquel Zita Gomes, Laura Silva, João Coimbra, Isabel Guerra, André Correia, Mário Vasconcelos, Ana Cristina Braga

Optimization of a Perfusion Bioreactor for Tissue Engineering
Dino Freitas, Henrique A. Almeida, Paulo J. Bártolo

Integration of image processing and 3D techniques to simulate aesthetic dental treatments
R. Pulido, J.J. Jiménez, A. Rodríguez

Reinforced PCL scaffolds with EggShell powder
Sara I. Biscaia, Tânia F. Viana, Henrique A. Almeida, Paulo J. Bártolo

IL1 gene cluster polymorphisms and peri-implant disease
Margarida Sampaio-Fernandes, Paula Vaz, Patrícia Fonseca, J.C. Reis Campos, Maria Helena Figueiral

Optimizing regions for characterization of thermal images in medical applications
Ana Duarte, Luís Carrão, Margarida Espanha, Tânia Viana, Dino Freitas, Paulo J. Bártolo, Paula Faria, Henrique A. Almeida

Gingiva Assessment tool – a clinical decision support system to evaluate the esthetic risk for gingiva-shade ceramics in a fixed dental prosthesis
Pedro Couto Viana, André Correia, Zsolt Kovacs, Ivo Lopes, Luís Eustáquio

Geometric and structural comparion of anatomic models from DICOM softwares
Ruba Zeibak, Dino Freitas, Henrique A. Almeida, Paulo J. Bártolo

An electromagnetic tracker system for the design of a dental superstructure
António H.J. Moreira, Sandro Queirós, Nuno F. Rodrigues, A.C.M. Pinho, Jaime C. Fonseca, João L. Vilaça

Quality evaluation of websites with information on child dental trauma in Portuguese language
M. Crespo, J. Carvalho, A. Correia, P. Mesquita

16:30 ***Coffee break***

Sunday (Room: 'Auditório')	
17:00	**Oral presentations – Session IV** Chairpersons: Mª Cristina Manzanares Céspedes / Rui B Ruben Dental tissue classification using computational intelligence and digital image analysis Gustavo Vaccaro, José Ignacio Pelaez Preliminary inertial study of body postures during dental procedures Vanessa Silva, José Reis Campos, Helena Figueiral, Pedro Fonseca, Eugénia Pinho, Mário Vaz Degradation modelling of bio-copolymers used as dental scaffolds Javier Tarrío Saavedra, Salvador Naya, Jorge López Beceiro, Sonia Zaragoza, Sara Quintana Pita, Francisco Javier García Sabán Influence of composite temperature on the marginal seal in dental restorations Sebastiana Arroyo Bote, Javier Martínez Arroyo, Javier Martínez Osorio, Patricia Carvalho Lobato, Mª Cristina Manzanares Céspedes Evaluation of orthodontic forces applied by a quad-helix apparatus Ana Botto, Mario Vaz, Josep Ustrell Raman confocal microscopy to study aesthetic restorative materials Sebastiana Arroyo Bote, Javier Martínez Arroyo, Javier Martínez Osorio, Patricia Carvalho Lobato, Mª Cristina Manzanares Céspedes Characterization of trabecular bone morphology by isolation and construction of cubic models using computerized microtomography Guillem Vallespí Miró, Manuel Herrera Lara, Patricia Carvalho Lobato, Victòria Tallón Walton, Ivan Valdivia Gandur, Mª Cristina Manzanares Céspedes Optimization of the procedure for obtaining DPSCS by means of fragile fracture in clean room conditions Corrado Paganelli, Arnalda Lanfranchi, Patricia Carvalho Lobato, Victòria Tallón Walton, Mª Cristina Manzanares Céspedes
19:30	***Departure for conference dinner***

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Sunday (Room: 'Gomes de Amorim')	
	Theoretical and practical course: **Clinical assessment of jaw dynamics and bite force determination** Lecturer: Urbano Santana-Mora, Co-lecturer: Urbano Santana-Penín Chairperson: Reis Campos
09:00	Module 1. Load-cell device: Recordings of jaw-loading will be carried out in a clinical setting. Symmetric and asymmetric oral tasks. 1h Module 2. Occlusography (using T-Scan): Determination of the occlusal contact pressures; Static-centric and dynamic-eccentric occlusal recordings. 1h
10:30	***Coffee break***
11:00	Module 2. (cont.) Occlusography (using T-Scan): Determination of the occlusal contact pressures; Static-centric and dynamic-eccentric occlusal recordings. 1h Module 3. Axiography: Graphic determination of the condylar path using a conventional axiograph. 1h
13:00	***Lunch (Restaurant ground floor)***
14:00	Module 3. (cont.) Axiography: Graphic determination of the condylar path using a conventional axiograph. 1h Module 4. Kinesiography: Determination of the jaw movements during different oral tasks. 1.5h
16:30	***Coffee break***
17:00	Module 4. (cont.)Kinesiography: Determination of the jaw movements during different oral tasks. 1.5h Module 5. Diagnosis of some clinical conditions of an individual with temporomandibular joint disorder. 0.5h
19:30	***Departure for conference dinner***

CONFERENCE DINNER

Conference dinner		
20:00	Casino da Póvoa	

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Monday (Room: 'Gomes de Amorim')

08:30	**Thematic session - Biomaterials in oral rehabilitation I** Chairpersons: Filipe Silva / Bruno Henriques Evaluation of collagen fibers orientation around different connection implants M.A.R. Araujo, D.S.M. Castro, G.M.P. Juanito, M.A.P.P.N. Oliveira, C.A.M. Benfatti, R.S. Magini, C.A.M. Benfatti, A. Piattelli, C.R.P. Araújo Evaluation of the bone formation on titanium implants electrically stimulated: study in dogs Letícia M. Bins-Ely, Ernesto B. Cordero, Cesar A. Benfatti, Ricardo S. Magini Influence of the porosity and chemical composition on wear and mechanical strength of dental composites Daniela S. Rodrigues, Mihaela Buciumeanu, Bruno Henriques, Julio C.M. Souza, Filipe S. Silva Thermal residual stresses in functionally graded dental restorations Bruno Henriques, Georgina Miranda, Rubens Nascimento, Julio C.M. Souza, Filipe Silva Hydrogel-based biomaterials for oral/dental tissue engineering Luismar M. Porto Influence of implant placement time and positioning on dental implant-bone interface Cesar A.M. Benfatti, Bernardo B. Passoni, Angélica R. Araujo, Carlos R.P. Araújo, Ricardo S. Magini Comparison of bone loss on immediate and delayed dental implants Juan F.D. Montero, Carolina S. Morsch, João G.O. de Souza, Bruno Henriques, Julio C.M. Souza, Marco A. Bianchini Comparison of shear strength of different otrthodontic adhesives to dental enamel Vando Ribeiro Neto, Monica Pinho, Bruno Henriques, Júlio C.M. Souza, Filipe S. Silva
10:30	***Coffee break***

Monday (Room: 'Auditório')

	Thematic session - Bone tissue remodelling numerical analysis I Chairpersons: Jorge Belinha / António Completo
08:30	A variable finite element model of the human masticatory system Simon Martinez, Hans J. Schindler, Jürgen Lenz, Karl Schweizerhof Stress analysis of human periodontal ligament loading. Implications for its damage. Amaya Pérez del Palomar, Urbano Santana-Mora, Urbano Santana-Penin, Mª Jesús Mora, José Cegoñino The assessment of the generated temperature by the drill bit in the bone tissue Cátia S.T. Sampaio, Elza M.M. Fonseca, Rui Cerqueira, João E. Ribeiro The bone tissue remodelling analysis in dentistry using a meshless method J. Belinha, L.M.J.S. Dinis, R.M. Natal Jorge A biomechanical analysis of a maxillary overdenture retained by divergent implant attachments Artur Miler, André Correia, José Mário Rocha, J.C. Reis Campos, Nuno Viriato Ramos, Mário Vaz Fracture toughness in interface systems Ni-Cr / Ceramic, Alumina / Ceramic and Zirconia / Ceramic Carla Porto, Marco Parente, Renato Natal Jorge, Luiz Pereira, Sandro Griza 3D finite element biomechanical model of the mandible-mucosa-expander apparatus set Iracema Maria Utsch Braga, Daniel Rocha Neves, Ricardo Luiz Utsch, Estevam Barbosa de Las Casas, Roberto Márcio de Andrade, Renato Natal Jorge, Rafael Utsch Braga Parametric evaluation of cortical bone thickness behavior on stress/strain of a dental implant João Paulo de Oliveira Freitas, Vinícius Bianco, José Henrique Rubo, Paulo José Palpitz Gonçalves, Edson Antonio Capello Sousa
10:30	***Coffee break***

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Monday (Room: 'Auditório')	
11:00	**Invited Lecture** The oral system biodynamic and chewing function Urbano Santana-Mora, University of Santiago de Compostela, Spain Chairperson: Reis Campos
12:00	**Thematic session - Biomaterials in oral rehabilitation II** Chairpersons: Júlio Souza / Bruno Henriques Study of the porcelain powder injection parameters for the production of zirconia reinforced porcelain composities Rafaela Santos, Bruno Henriques, Rubens Nascimento, Julio C.M. Souza, Filipe Silva, Fabiana Motta Bio-Tribocorrosion of titanium in Dentistry Júlio C.M. Souza, Mariana Henriques, Wim Teughels, Jean-Pierre Celis, Luís A. Rocha Chemical and microstructural analyses of a functionalized poly-ether-ether-ketone (peek) to incorporate antimicrobial compounds Henrique Tajiri, Juan Montero, Andrea Pimenta, Ricardo Magini, Guilherme Barra, Márcio Fredel, Júlio C.M. Souza The Importance of Functional gradients in dental solutions Filipe Silva, Bruno Henriques, Marcio C. Fredel, Julio C.M. Souza
13:00	***Lunch (13th floor)***

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Monday (Room: 'Auditório')	
14:00	**Bone tissue remodelling numerical analysis II** Chairpersons: António Completo / Jorge Belinha Numerical analysis of a teeth restoration: a meshless method approach C.S.S. Tavares, J. Belinha, L.M.J.S. Dinis, R.M. Natal Jorge Fracture resistance of single-tooth implant-supported Paulo Piloto, Joana Piloto Mechanical behaviour of dentures clasps in acetal resin and cobalt-chromium: a numerical analysis Ana Lopes, André Correia, Nuno Ramos, Mário Vaz, J.C. Reis Campos Comparative analysis of mandibular symphysis plates Jairson C. Dinis, Rui B. Ruben, Daniel T. Kemmoku, Pedro Y. Noritomi, Jorge V.L. Silva Simulation of remodeling of tissue engineered condylar cartilage under hydrostatic pressure Cátia Bandeiras, António Completo, António Ramos Finite element analysis of bio-inert mass effect on stress reduction in bone-dental implant interface Ghalem Mehdi, Abderrahmane Belarbi, Bensmaine Mansouri, Zitouni Azari The non-linear analysis of the bone tissue using a meshless method H.M.S. Duarte, J. Belinha, L.M.J.S. Dinis, R.M. Natal Jorge
16:00	***Closing Session***
16:30	***Close Coffee***

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Monday (Room: 'Gomes de Amorim')

14:00	**Oral presentations – Session V** Chairpersons: Paula Vaz / André Correia Biomechanical analysis of typical structured dental implants and surrounding bone tissues Xiao Zhang, Xianshuai Chen, Gong Zhang, Jianyu Chen A finite element study of the Quad-Helix appliance deformation when submitted to a force Ana Botto, Mario Vaz, Josep Ustrell Mathematical modeling of spatio-temporal dynamics of bone remodeling Sílvia Barbeiro Mechanical properties of denture base resin ivobase system®: an evaluation J. Carvalho, S. Félix, J.C. Reis Campos, J.S. Fernandes Fetal face ultrasound and early craniofacial syndrome diagnosis Mariana Seabra, Tatiana Semedo, Inês Côrte-Real, António Felino, Rosete Nogueira, Francisco Valente, Paula Vaz All-ceramic CAD-CAM Maryland Bridge– a numerical stress analysis Ivo Lopes, André Correia, P. Couto Viana, Zsolt Kovacs, Nuno Viriato, José C. Reis Campos, Mário A. Vaz Tooth germs histology – a tool for fetal age? Mariana Seabra, Rosete Nogueira, Francisco Valente, Ana Cristina Braga, António Felino, Paula Vaz Biocide activity of two different glass-fibers for bone defects restoration L. Esteban-Tejeda, J.S. Moya, B. Cabal, R. Torrecillas, C. Prado, R. López-Piriz, F. Quintero, J. Pou, J. Panide, F. Guitian, A. Martinez
16:00	***Closing Session (Auditório)***
16:30	***Close Coffee***

PÓVOA DE VARZIM[1]

Póvoa de Varzim is a Portuguese city in Northern Portugal and a sub-region of Greater Porto. It sits in a sandy coastal plain, a cuspate foreland, halfway between the Minho and Douro rivers. The population of the municipality was 63,408 at the time of the 2011 census. The city expanded, southwards, to Vila do Conde, and there are about 100,000 inhabitants in the urban area alone. It is the seventh largest urban agglomeration in Portugal and the third largest in Northern Portugal.

Permanent settlement in Póvoa de Varzim dates back to around four to six thousand years ago; around 900 BC, unrest in the region led to the establishment of Cividade de Terroso, a fortified city, which developed maritime trade routes with the civilizations of Classical antiquity. Modern Póvoa de Varzim emerged after the conquest by the Roman Republic of the city by 138 BC, fishing and fish processing units soon developed, which turned out to be the foundations of the local economy. By the 11th century, the fish industry and fertile farmlands were the economic base of a feudal lordship and Varzim was fiercely disputed between the local overlords and the early Portuguese kings, which resulted in the establishment of the present day's municipality in 1308 and being subdued to monastic power some years later. Póvoa de Varzim's importance reemerged with the Age of Discovery due to its shipbuilders and merchants proficiency and wealth, who traded around the globe in complex trade routes. By the 17th century, the fish processing industry rebounded and, some time later, Póvoa became the dominant fishing port in northern Portugal.

Póvoa de Varzim has been a well-known beach resort for over three centuries, the most popular in Northern Portugal, which unfolded an influential literary culture and artistic patronage in music and theater. Póvoa de Varzim is one of the few legal gambling areas in Portugal, and has significant textile and food industries. The town has retained a distinct cultural identity and ancient customs such as the writing system of siglas poveiras, the masseira farming technique and festivals.

PÓVOA DE VARZIM - Transport

Póvoa de Varzim is served by a transportation network that employs maritime, aerial and terrestrial travel. The terrestrial access infrastructure is composed of national motorways (freeways), the national roads system, and light rail metro. These infrastructures and the airport, bus terminal, marina and harbour are daily used by commuters.

Public transportation within the city is provided by private-owned companies. The Central de Camionagem is a terminus for urban and long distance buses that provide mass transit in the surrounding region, namely the city's countryside, Porto, Minho Region, and Galicia in Spain. Litoral Norte as a wholly urban transportation network with 5 lines, while Linhares has the oldest bus network operating in the city, now owned by Transdev.

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[1] Adapted from http://en.wikipedia.org/wiki/P%C3%B3voa_de_Varzim

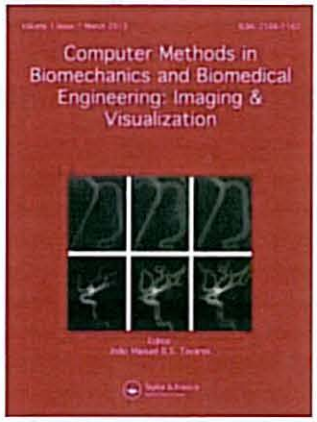
The Francisco Sá Carneiro Airport (LPPR, better known as Porto Airport) is located 18 km (11 mi) south of the city. It is one of the busiest international airports in Portugal and serves all Greater Porto. Póvoa Aerodrome, officially known as S. Miguel de Laundos, is small-sized, with only 270 meters long for ultralight aviation and other small planes.

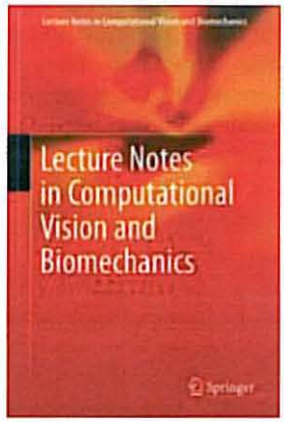
Line B of Porto Metro links Póvoa de Varzim to Porto and the airport with two services: a standard and a shuttle (the Expresso); through Verdes station, Metro trains link the city and the airport.

The city is connected by road on a north-south axis from Valença, Viana do Castelo, and Esposende to Porto by the A28 motorway. It is also reached by the A7 (from Guimarães and Vila Nova de Famalicão) and A11 (from Braga and Barcelos) motorways on an east-west axis, through the south and north of the city, in that order, and both cross the A28. Although it lost usefulness for average and long distances, the National Roads system has acquired municipal interest: EN13 that cuts the city in half, in a north-south direction, is used by commuters originating from the northern suburbs and from the city of Vila do Conde, in the south, to travel downtown. The EN205 and the EN206 are used by commuters starting from the interior of the municipality.

The traditional road system of the city, composed of roads that run parallel in the direction of the sea, can be seen in any of the following avenues: Avenida do Mar, Avenida Vasco da Gama, Avenida Mouzinho de Albuquerque, and Avenida Santos Graça. The Avenida dos Descobrimentos and Avenida dos Banhos, in other hand, run parallel to the coast. The growth of the city inland and northwards made ring roads more important, this can be seen in Avenida 25 de Abril, an urban belt road.

ABSTRACTS





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THE ASSESSMENT OF THE GENERATED TEMPERATURE BY THE DRILL BIT IN THE BONE TISSUE

Cátia S.T. Sampaio (1), Elza M.M. Fonseca (1), Rui Cerqueira (2), João E. Ribeiro (1)

1. Instituto Politécnico de Bragança,
catia.sampaio1@gmail.com; efonseca@ipb.pt; jribeiro@ipb.pt
2. Rui Cerqueira Médico-Dentista, ruicerqueiramd@hotmail.com

Introduction

Science and technology applied to health are meant to enhance the quality of the human life. In dental implants placement the variables that affect the bone drilling process are many: speed, material, diameter, length and geometry of the drill point. There are several researches on how to avoid adverse effects on the bone patient structure. Hillery's research supported the earlier findings of Lundskog highlighting that necrosis can be induced if the bone is exposed over 30s at temperatures above 50°C [1]. In general, the literature indicates that if the temperature rises above 55°C, in a period of 1,5 minutes, several weeks will be needed for a new bone regeneration process [2].
The main goal of this work is to evaluate the developed temperatures in bone tissue due to a drilling process, and verify the hypothesis of the thermal necrosis occurrence. Experimental methods were used in the laboratory based on the use of thermography and thermocouples during bone drilling in different materials. The follow-up of patients was also performed during the dental implants placement for data collecting from thermographic images.

Material and methods

In this study for the experimental setup, four blocks from *Sawbones*, a computer, a data acquisition MGC Plus system, type K thermocouples, a video camera, a thermographic camera and a CNC machine programmed for drilling blocks were used. The four blocks from Sawbones with different densities (+D and -D) have similar properties to the human bone (cortical C or trabecular T), figure 1.

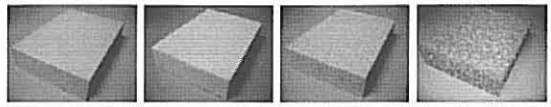

Figure 1: Blocks from *Sawbones* (C+D, C-D, T+D, T-D).

Then several tests were carried out in such a way that was possible to register the temperature, on the drill bit and in bone material, as shown figure 2. For the temperature recording in the drill bit a thermographic camera was used. For temperature measurement in all blocks different thermocouples placed within the different materials were used.

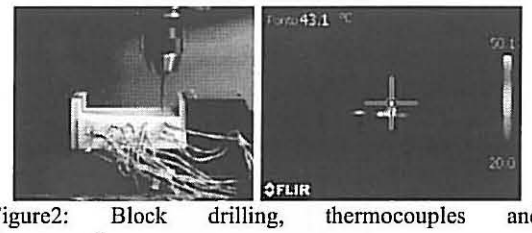

Figure2: Block drilling, thermocouples and thermography.

During the clinical follow-up, a thermographic camera was used to the temperature record on the drill bit, at the same time as, the bone drilling in the patient occurs, figure 3.

Figure 3: Dental Clinic and thermography.

Conclusions

The results obtained in dental clinic show that with the use of irrigation and different parameters combination, the thermal necrosis not occurred because the drilling temperature not exceeded 33°C. Concerning the experimental component it was possible to observe that the temperature in the drill is always higher than the temperature recorded in the material. In trabecular block material (T+D and T-D) and in cortical with lower density (C-D) higher temperatures were registered in some cases. In same positions the threshold value of necrosis was reached. However in the block with higher density (C+D) the thermal necrosis didn't occur.

References

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