

# Acordo bilateral entre as universidades de Gotemburgo/Suécia e Sagrado Coração/Bauru/Brasil, movimenta Brazilian Day

Por Franklin Moreira Leahy – cirurgião-dentista (franklinleahy@mac.com)



Profs. Drs. Carlos Eduardo Francischone, Tomas Albrektsson e Luis Rogério Duarte, responsáveis pelo acordo de cooperação científica entre Universidade do Sagrado Coração – USC/Bauru/Brasil e Departamento de Biomateriais da Universidade de Gotemburgo/Suécia.



Grupo Brasileiro em visita a Astra Tech Dental, na cidade de Mölndal/Suécia.

Cabe um breve histórico para entendermos melhor o título desta matéria. No dia 4 de setembro de 2009, no Anhembi, São Paulo, no transcurso do evento comemorativo aos 20 anos de Osseointegração no Brasil, foi assinado um acordo entre o Departamento de Biomateriais da Universidade de Gotemburgo/Suécia e a Unidade de Implantologia da Universidade Sagrado Coração/Bauru/Brasil, visando o intercâmbio educacional e a cooperação técnico-científica no campo da pesquisa entre as duas renomadas instituições.

O êxito desta iniciativa deveu-se ao empenho particular de algumas pessoas de visão, com interesses comuns científicos e institucionais, que trouxeram para os cirurgiões-dentistas brasileiros da pós-graduação, a possibilidade de desenvolver seus estudos no berço da osseointegração e em um dos mais avançados centros de pesquisas do mundo. A USC/Bauru, por intermédio de seu coordenador do Programa do Doutorado e Mestrado em Implantologia, o Prof. Doutor Carlos Eduardo Francischone, ainda no ano passado, destacou imediatamente o doutorando Márcio Borges Rosa para dar início a esta conexão científica.

Audiência nas palestras da Astra Tech Dental – Mölndal/Suécia.



Oficializaram este importante acordo o Prof. Doutor Tomas Albrektsson (Chairman and Head, Department of Biomaterials/Handicap Research, Institute of Surgical Sciences), Gottenburg University; a Reitora da USC, Irmã Elvira Milani; o pró-reitor de pesquisa e pós-graduação da USC, Prof. José Jobson de Andrade Arruda; o Prof. Doutor Carlos Eduardo Francischone (Coordenador do Programa de Doutorado e Mestrado em Implantologia – Pós-graduação – USC). É importante destacar também a presença e a participação direta do ex-aluno da pós-graduação da USC,



Stig Hansson (Senior Scientific Executive, Research and Development), um dos seis palestrantes da Astra Tech Dental, para o grupo brasileiro.



*Doutorando Márcio Borges Rosa, da USC/Bauru, indicado pelo Prof. Dr. Francischone para iniciar o intercâmbio científico na Universidade de Gotemburgo.*



*Prof. Dr. Tomas Albrektsson abre a Oral Presentation Section no Brazilian Day II, no Karisaksson Auditorium Medicinagatan, com as boas-vindas aos colegas brasileiros.*



*Sessão de apresentação dos painéis, diante da banca composta pelos condutores do evento os Profs. Drs.: Carlos Eduardo Francischone, Tomas Albrektsson e Luís Rogério Duarte.*



*Grupo Brazilian Day II, na Universidade de Gotemburgo, com o Prof. Tomas Albrektsson, a sete graus negativos.*

de pesquisa da empresa foram ministradas pelos seguintes palestrantes: Mia Jensen; Anders Holmén; Stig Hansson; Mia Hofgren; Vanja Styffe Nilsson; Gunnar Bagge.

No dia seguinte, 23 de novembro, a delegação brasileira foi recebida pelo Prof. Dr. Tomas Albrektsson, para o encontro que reuniu 18 palestras intercaladas, proferidas por colegas brasileiros e suecos; sessão de 14 pôsteres exibidos pelo grupo brasileiro e por três convidados portugueses. Ao final do dia, visita ao Departamento de Biomateriais da Universidade de Gotemburgo, onde foi possível conhecer de perto sofisticados equipamentos para estudo e pesquisa, local onde também trabalhou o descobridor do revolucionário fenômeno da osseointegração, o médico e cientista Prof. P-I Brånemark. Por esta razão, erguem-se em meio ao complexo de edifícios que compõem a referida universidade, um memorial e uma estátua em tamanho natural, em sua homenagem.

As sessões orais foram realizadas no Karisaksson Auditorium Medicinagatan, onde coube a cada apresentador o tempo de 12 minutos para exposição de sua apresentação e três minutos para as perguntas. A grande maioria dos trabalhos dos colegas brasileiros são resultados de pesquisas que vêm sendo desenvolvidas na Universidade Sagrado Coração – USC, e que também serão os temas de suas teses de mestrado ou de doutorado.

Para a sessão de pôsteres, uma banca composta pelos condutores do evento – os professores doutores: Tomas Albrektsson, Carlos Eduardo Francischone e Luís Rogério Duarte – acompanhou atentamente as apresentações dos autores de cada um dos painéis e, em seguida, elegeu três trabalhos com o destaque de “Menção Honrosa”.

Com muita expectativa, aguardaremos, para 2013, o Brazilian Day III.



*Departamento de Biomateriais da Universidade de Gotemburgo. Aqui trabalhou o Prof. Dr. P-I Brånemark, descobridor do fenômeno da Osseointegração.*

Prof. Doutor Luís Rogério Duarte, mentor e fomentador da parceria, assim como o responsável pela criação do evento científico realizado na Suécia pelas duas universidades, intitulado bilateralmente como Brazilian Day.

Diante do exposto, fica bem mais claro entender o programa elaborado para esta segunda edição do Brazilian Day. Na pauta, o dia 22 de novembro foi inteiramente dedicado à visita à sede da Astra Tech Dental, na cidade de Mölndal-Sweden, onde seis conferências sobre os produtos e linhas



*Conhecendo o Departamento de Biomateriais da Universidade de Gotemburgo/Suécia, cujo atual chefe responsável é o Prof. Dr. Tomas Albrektsson.*

# BRAZILIAN DAY II

No dia 26 de novembro último aconteceu o encontro Brazilian Day II, sendo parte de um acordo assinado entre o curso de Pós-graduação em Implantologia (mestrado e doutorado), representado pelo coordenador Prof. Dr. Carlos Eduardo Francischone, da Universidade do Sagrado Coração, e pelo Prof. Dr. Tomas Albrektsson, chefe do Departamento de Biomateriais da Universidade de Gotemburgo, Suécia. A comitiva científica contou com mais de 30 alunos dos cursos de mestrado e doutorado *strictu sensu* de ambas as universidades. Este acordo visa a troca de experiências e o desenvolvimento didático e científico. A seguir, estão reproduzidos apenas os resumos das apresentações orais.

## Placement and implant loading with the use of recombinant bone morphogenetic protein-2 (rhBMP – 2)

Miranda DAO, Almeida JM, Leahy FM, Rossetti PHO, Francischone CE, Blumenthal N

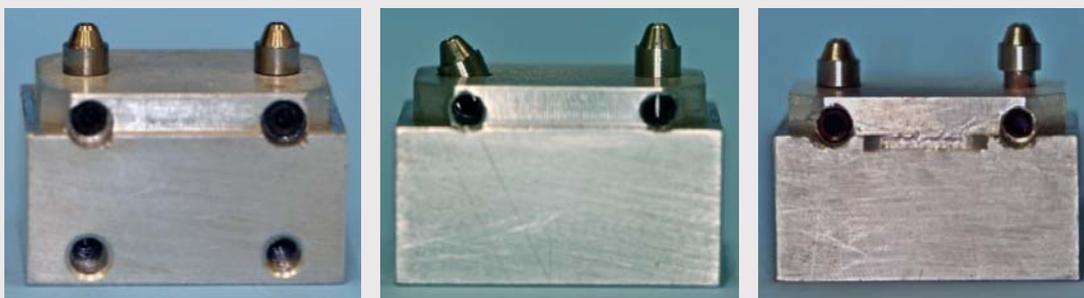
Bone morphogenetic proteins (BMPs) have been shown to induce new bone formation in vivo and have great potential in promoting hard tissue repair. Successfully bone formation depends on the appropriate delivery system for BMPs. Resorbable collagen sponge (ACS) is a suitable carrier for ridge augmentation; however, it cannot resist to compressive forces. This shortcoming has prompted evaluations on the feasibility of other delivery systems. Hydroxyapatite (HA) carriers with rhBMP-2 have been shown to induce bone formation in ridge defects, but the quality was compromised. The aim of the present study is to evaluate the regeneration of alveolar ridge defects following surgical implantation of recombinant bone morphogenetic protein-2 (rhBMP-2) using two different constructs: a) Tricalcium Phosphate (TCP)/ Hydroxyapatite (HA)/ Absorbable collagen sponge (ACS) and b) HA-BSM cement (CaPO<sub>4</sub>) in a baboon model (Papio anubis). Standardized type III (Siebert et al 1983) alveolar ridge defects (~ 15 X 8 X 5 mm) were made in 4 edentulous areas (2 per jaw quadrant) in each animal. Sites were balanced as to treatments and maxilla/mandible. Five materials were implanted: rhBMP-2/TCP/HA/ACS, TCP/HA/ACS/buffer, rhBMP-2/HA-BSM (CaPO<sub>4</sub>), HA-BSM (CaPO<sub>4</sub>)/buffer and non-implanted controls. A dose of 0.4-mg/ml rhBMP-2 was used for rhBMP-2 treated sites. Block sections (middle-defect areas) were harvested at 16 weeks, processed for light microscopy, stained with Masons Trichrome and central sections were evaluated for trabecular bone area, marrow space area and density using the Computerized Image Program (Image Tool for Windows Version 2.0). Statistical comparisons among treatments were made using Anova. Carriers by themselves demonstrated sufficient rigidity, resistance to compression and space maker capacity to provide for modest ridge augmentation. The addition of rhBMP-2 resulted in statistically significant more trabecular bone, less marrow space and higher density than the carriers alone. The rhBMP-2/HA-BSM (CaPO<sub>4</sub>) results were not statistically significant (p > .05) over the rhBMP-2/TCP/HA/ACS implant. Thus, both TCP/HA/ACS and HA-BSM (CaPO<sub>4</sub>) appear to be suitable carriers for rhBMP-2. The enhancement of both carrier systems with rhBMP-2 provided a viable alternative to second site grafting for the augmentation of alveolar ridge defects prior to implant placement.



### **Influence of impression techniques in different situations on the dimensional accuracy of master casts for multiple, implant-supported prostheses**

*Consalter G, Rossetti PHO, Oshima HM*

Purpose: to determine which association between impression material and transfer technique promotes less linear dimensional changes between implant analogs in fixed implant prostheses. Materials and methods: three master metal frameworks were made of anodized aluminum. The framework number 1 had two parallel implant analogues, 20 mm from each other; in framework number 2 one analog was located at 2 mm above the other implant platform and in framework number 3, one analog had a 65° inclination. Five impression techniques were tested: indirect impression technique with no splinted transfer coping and no adhesive on transfer copings (group a), direct impression technique with splinted transfer coping and no adhesive on transfer copings (group c), direct impression technique with no splinted transfer coping and adhesive on transfer copings (group d), direct impression technique with splinted transfer coping and adhesive on transfer copings (group e). Each group was divided in 1, 2 and 3 according to the number of the used framework. According to preliminary results of this study, just the framework number one was tested. Preliminary conclusions: open tray, no splinted transfer coping and no adhesive was the most similar to the master model when we use polyether impression material.



### **A new midline mandibular access and technique for chin bone graft harvesting**

*Pimentel Neto GS, Francischone CE, Rossetti PHO, Montenegro AC, Carneiro RC, Leme NP*

The chin is a very common donor site for autogenous bone grafts; however, it also involves donor site morbidity. Chin graft morbidity involves impaired sensibility in the frontal teeth, the gingival and skin postoperatively. This prospective controlled clinical trial present and evaluated a useful technique for chin access using a new midline mandibular access (MMA) and bone graft harvesting with trephine drill. Ten consecutive patients requiring reconstruction of anterior maxillary single tooth were selected. A total vertical soft tissue flap was performed over the mandible buccal midline starting 5mm under the free gingiva limit and finishing in the posterior limit at the orbicularis oris muscle. The bone block was removed with 8mm diameter trephine drill positioned parallel to the mandible base respecting anatomical limits. Postoperative sensibility of the lip, teeth, and gingiva was registered. There were no reports of lip paresthesia or infection. This technique can be employed often and has a very low complication rate.



## Clinical, radiographic and histological evaluation of a synthetic, non-ceramic resorbable hydroxyapatite (OsteoGen) used as a Putty with or without DFDBA in the maxillary sinus

Ostetto S, Francischone CE

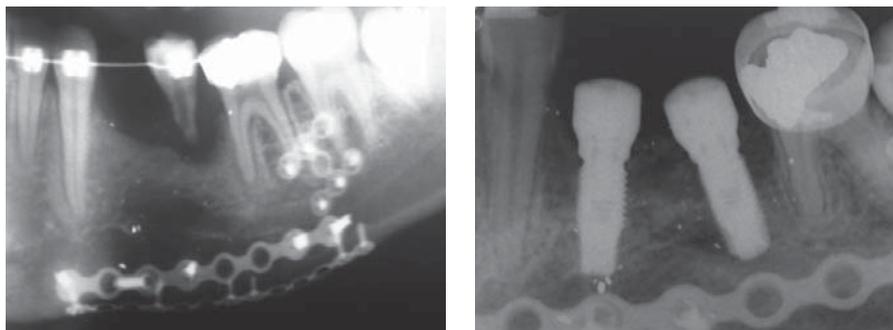
The sinus lift procedure has been used over the years as a technique with high predictability being possible to place implants in the maxillary posterior region. The hydroxyapatite commercially known as Osteogen is a resorbable and non-ceramic type of hydroxyapatite (About 60% to 80% of this material resorbs between 4 to 6 months and the remaining is incorporated to the new bone formation). It is a Synthetic material produced through a low temperature process being highly hydrophilic. The literature shows that this hydroxyapatite has been used in sinus lift procedures since 1969. A new generation of regenerative materials obtained through this hydroxyapatite (OsteoGen) has been recently studied. Synthetic Bioactive Resorbable Putty (SBRP) known as OsteoGen Putty and Synthetic Bioactive Resorbable Putty (SBRP) with the incorporation of human demineralized bone matrix (DBM) known as OsteoXcel have been used in sinus lift surgeries. Clinical, radiographic and histological responses have been analyzed after these procedures. Preliminary results showed great compatibility of these materials with hard and soft tissues. The characteristics of the new bone formation (Quantity and quality) became possible the implants placement as well as the maintenance of the osseointegration of them.



## Vertical and horizontal alveolar ridge augmentation minimally invasive surgery concept

Kricheldorf F, Bergamin M, Valente V, Cravinhos J, Rossetti PHO, Francischone CE

One of the great challenges in dentistry, particularly regarding surgery for implant installation in the posterior region of severely atrophic mandible has been widely discussed. However, solutions have not been so satisfactory to a great extent. Alternatives such as bone distraction, inferior alveolar nerve dislocation, autogenic and allogenic graft (bone transplant) and short implants present a series of prerequisites and the results show a satisfactory resolution in those cases, though far from what we have in mind. Situations such as fibrosed gum mucosa (intra-oral bone distraction), inferior alveolar nerve damages (inferior alveolar nerve dislocation), complications such as postoperative infection and loss of graft (bone transplant) and loss of the short implants have been frequently described through the international casuistry. Thinking in general about the evolution in health and trends in surgical techniques, one came up with the concept of minimally invasive procedures for this kind of problem which is so common in our daily life. This paper will present the Kricheldorf Technique, which consists of vertical and horizontal reconstruction of the remaining alveolar ridge in the posterior region of the lower mandible (very atrophic) through a simple surgical technique and with foreseeable results, thus allowing, afterwards, the fixation of dental implants in an adequate place and complying with the standard technical norms for its installations in the posterior mandibular region, respecting the postulates of Spee's and Wilson's curves, having an adequate implant-crown proportionality. Also, having as main characteristics the reduced surgical time, small incisions, original mucoperiosteal bed (original gingiva), without any fibrotic alterations and a wide space for the installation of implants without any difficulties in this critical area. This "Minimally Invasive Surgery Concept" can be used without any great difficulties by any dentist who has the basic knowledge of the surgical principles. This presentation will show the steps of this technique, as well as the foreseeable results in a seven-year follow-up period.



### Retrospective tomographic study of neurovascular plexus on the anterior mandible

Rosa MB, Francischone CE, Gonçalves ES, Machado VC, Martins AF

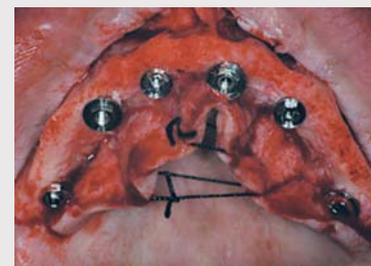
With the introduction of the Brånemark et al protocol for mandibular-fixed, implant-supported prostheses, the anatomy of this region has become very important for surgeons because of the risk of injury to nervous plexus and consequent sensory dysfunction. Thus, different techniques have been proposed, with different implant number, and positions. In this way, the distal implants should be as close as possible to the mental foramen due to biomechanical reasons for reducing the length of distal cantilever, which increases the risk of nerve injury, especially in the presence of the loop, of the mandibular canal. The implants also pass through the regions of the incisive nerves and sometimes, through the spinal plexus in the midline of the mandible. Sensorial problems have been demonstrated upon nerve piercing. The aim of this study is to determine the nerve loop pattern, the incisive nerve and the spinal plexus, and suggest, from the anatomical standpoint, the safer position for implants' placement, by evaluating 325 CT scans from a total of 2,100 examinations.



### Biomechanical behavior of platform switched, immediate-loaded implants in completely edentulous jaws

Peredo-Paz LG, Filho HN, Francischone CE

Our main purpose was to evaluate the behavior of cervical bone around implants using the Platform Switching concept in large rehabilitations supporting a full fixed temporary acrylic resin bridge submitted to immediate loading. Nine maxillary edentulous patients were treated in this study and each one received six external hexed implants, three of these implants were 5mm expanded cervical platform (XP, Biomet 3i, USA) and the other three implants were regular cervical platform diameter (ST 4.1 mm, Biomet 3i, Brazil). All installed implants received standard diameter components (4.1 mm Biomet 3i), characterizing the platform-switching concept on the XP implants. The implants' installation was performed in an alternating fashion. The process initiated always from the right side with one type of implant. The next implant had a different diameter at the cervical part. It all finalized with the installation of six implants on the left side of the maxilla. All cases were treated with a single surgical procedure to reduce trauma, using less drilling sequence to increasing the initial implant stability and the prosthetic components were installed immediately during surgery to perform the AFR with the Osstell Mentor system. The final impression was taken for the fabrication of the fixed screw retained acrylic resin bridges, using the provisional metal sleeves for micro-unit like abutments and delivered to the patients within 24 hours after surgery. At the placement of the restorations, 6 and 12 months later, control radiographies were performed using the conventional parallel cone technique to control the cervical bone behavior during these three periods. These x-rays were digitized and measured with the Radio Imp software. From 56 implants placed, only one failed during the first moment of observation, six months later. Peri implant cervical bone loss was found for both implant types. The ST implants showed an average bone loss of 1.61 to 1.99 mm in the vertical direction and 1.07 to 1.35 mm in the horizontal direction, during 6 and later 12 months of control. For the XP type of implants, we found 1.21 and 1.76mm for the vertical direction and 0.89 and 0.96 mm for the horizontal direction of bone loss during the same periods of observation. Within the limits of this study, both implants had good clinical result, but the XP implants rehabilitated under the platform switching protocol, showing less bone loss in vertical and horizontal components.



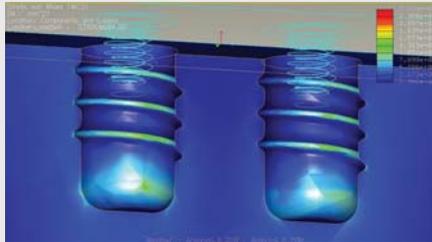
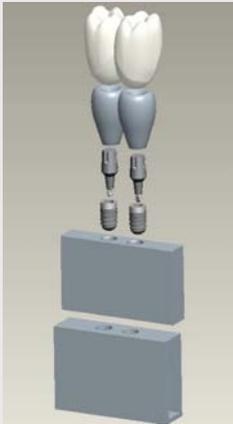
## Parcial rehabilitation at the mandible with short implants and long dental crowns: a 3D – finite element analysis

Medeiros ACQ, Ulzefer Jr. E, Rossetti PHO, Francischone CE

Due to early tooth loss and subsequent alveolar bone resorption in mandibular arches, short implants have been commonly used. Thus, prosthetic rehabilitation at these regions is typically achieved with fabrication of long prosthetic dental

crowns resulting in an unfavorable crown/implant ratio implying in biomechanical risks. The question is to whether splint these crowns or leave them as single elements. This paper uses the finite element analysis method to measure the force dissipation in mandibular bone-implant interface on prototype rehabilitations with short implants and unfavorable implant/crown ratio.

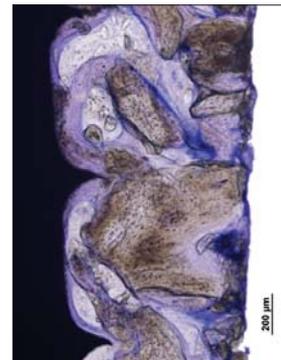
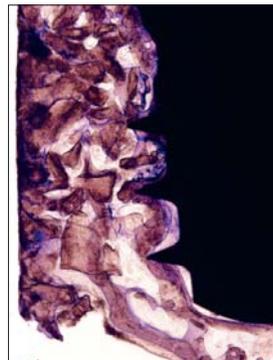
We compared the implant systems prototypes Ankylos and Straumann, with lengths of 6 and 8 mm in single and splinted rehabilitations with crowns of 20 mm length. An axial force of 382N was applied at the center of the occlusal face and a force of 8N perpendicular to lingual surfaces. Preliminary results show significant differences of force dissipation between systems and between lengths, but small differences between single and splinted crowns.



## Psychological disorders affecting the success of osseointegration

Fernandes KLB, Bonfim DC, Francischone CE, Rossetti PHO

Behavioral and psychological disorders can interfere with the quality of life of an invalid patient that received oral dental implants and bridges? A 60 year-old, Caucasian patient, whose chief complaint was the replacement of her denture by a fixed implant prosthesis, was addressed after bilateral maxillary sinus grafting followed by the installation of eight implants. A fixed complete prosthesis was made after the period of osseointegration. During the adjustment period with fixed rehabilitation, the patient showed strange behavior and systemic involvement, with clinical signs and symptoms: tachycardia, chest pain, anorexia and depressive disorders, due to the presence of implants and agreed to remove them. Histopathological analysis was performed of the bone-implant interface after removal, showing no structural and biological changes that would justify it. Despite the advancement of implantology in the controlling of surgical techniques, designs, surface implants and associated technologies are not able to guarantee the success of the rehabilitation. Patients must be psychologically prepared to accept and live with bionic bodies so that osseointegration does not cause any inference on the quality of their lives.



### The role of the collecting implant chamber: histological and histomorphometric study in minipigs

Francischone CE, Ultramari-Navarro PVP, Navarro RL, Cosenza H, Francischone Jr. CE

The most common way to install an implant is preparing an artificial cavity with rotation drills. Making this cavity needs a lot of care. Despite that, bone healing can happen because of friction. The image below shows heated bone close to cavity caused by drilling. Also, implant design has changed through years of development (P-I Brånemark Philosophi). A very useful design is the collection chamber. Placed at the apex of the implant, it can collect the heated bone and leave fresh bone in contact to implant surface to osseointegrate. A study made in minipigs shows the chamber is able to collect the heated bone leaving fresh bone at the walls of the cavity. The image below shows cavity after implant placement. microscopic analysis shows bone inside collection chamber, despite being collected from heated bone still viable bone and capable to osseointegrate. Results show the collection chamber may be an efficient strategy to enhance quality of bone in contact to implant. The bone collected still a viable bone.

