특별강연 / Special lecture

Special Lecture I

- Speaker : 조동우 (Prof. Dong-Woo Cho)
- Topic : 3D Printing Technology and its Biomedical Applications

Special Lecture I

- Speaker : 문영래 (Prof. Young Lae Moon)
- Topic : Utility of Medical AR & VR

Special Lecture I

- Speaker : 최재붕 (Prof. Jae-Boong Choi)
- Topic : Phono Sapiens leads the 4th industrial revolution
  – corporation's preparation for 4th industrial revolution –

Special Lecture I

- Speaker : 정원기 (Prof. Won-Ki Jeong)
- Topic : Dictionary Learning for biomedical image analysis

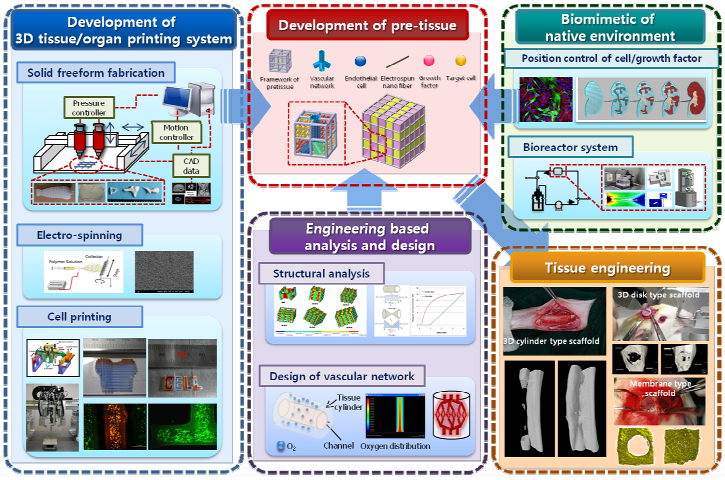
◈ 특별강연 I Special lecture I

Presentation Title
3D Printing Technology and its Biomedical Applications

Speaker
조동우 (Prof. Dong-Woo Cho) / POSTECH, Korea

2015 Nam-Go Chair Professor, POSTECH
2010 ~ Present Director, "Center for Rapid Prototyping Based 3D Tissue/Organ Printing"

Research at the IMS Laboratory focuses biomedical engineering, especially tissue engineering and regenerative medicine based on 3D Printing technology, which can be used to fabricate complex three-dimensional (3D) structures. This technology includes nano/micro-stereolithography (NSTL/MSTL) and a multi-head deposition system (MHDS), areas in which our research and development efforts have played a major role. The IMS Laboratory has attempted to apply these technologies to fabricate 3D scaffolds for tissue regeneration with high resolution. Moreover, using an automated computer-assisted design and machining (CAD/CAM) system, we can fabricate custom-made scaffolds that match the shapes of tissue defects. Currently, the IMS Laboratory is developing 3D cell/organ printing technology based 3D Printing technology for constructing integrated pre-tissues using both synthetic polymers and hydrogels. Our ultimate goal is tissue/organ regeneration by constructing and integrating the pre-tissues using this developed 3D tissue/organ printing technology. In this particular presentation, some results will be introduced regarding scaffold based tissue engineering and the feasibility of cell printing technology will be discussed.



◈ 특별강연 I Special lecture I

Presentation Title
Utility of Medical AR & VR

Speaker
문영래 (Prof. Young Lae Moon) / Chosun Univ., Korea

Chair of 3D Medical Application Work Group, IEEE-SA
(Modelling, Data Management, 3D Printing)

The standardization of medical 3D technology is urgent needs for designing medical devices that use 3D models and printings, for evaluating the stability of medical instruments that use the 3D printing, or for evaluation of hardware and software producing or using medical 3D models and printed material. Therefore, our working group sponsored by the IEEE Computer Society, Practical Applications of 3D Medical Modeling, investigates technical standards for medical 3D images, which include medical 3D modeling, visualization, simulation, data management.

A complete medical AR/VR for medical practice has 3 steps: 1) Pre-operative virtual planning of the clinical work, 2) CAD/CAM of medical instruments, and 3) computer-aided practice. This presentation will be regarding the issues of standard Medical Modeling and Printing for it.

Key Words : Medical 3D, Modeling, Printing, stl

◈ 특별강연 II Special lecture II

Presentation Title

Phono Sapiens leads the 4th industrial revolution
: corporation's preparation for 4th industrial revolution

Speaker

최재붕 (Prof. Jae-Boong Choi) / Sungkyunkwan Univ., Korea

Mar. 2010 ~ Present Professor, Dept. of Mechanical Eng., Sungkyunkwan Univ.
Mar, 2015 ~ Present Advisory Professor for SAMSUNG Electronics (SW Center, IoT group) Over 20 years of R&D experience in Convergence Design for Future IT products

Contents

1. Evolution of Homo Sapiens into Phono Sapiens
2. Characteristics of Phono Sapiens and Changes in Market Trends
3. The 4th industrial revolutions led by Phono Sapiens
4. Keyword for the 4th industrial revolution : 'Soft Power'
5. Corporation's preparation for future Market : CLICK-DESIGN

Abstract

The hyper-connected society, which is built by widespread uses of smartphones, has drastically turned people on the planet into Phono Sapiens by rapidly changing our mindsets and behaviors. Wearable devices and Internet of Things (IoT) capture spotlights as a newly developed industries. To be widespread, these industries' design should be aligned to the consumption patterns of the hyper-connected society. The characteristics of Global markets, where consumers are the main market leaders, are strengthening of online platforms, consumer market segmentation, and construction of eco-systems by building huge alliances. The keyword/agenda for 4th industrial revolution is 'Soft Power'which reflects characteristics mentioned above into business models. 'Soft Power'refers to such as big data analysis, artificial intelligence, smart factory and etc. This seminar will focus on understandings of the revolutionary market trend changes and development directions for corporations and society.

◈ 특별강연 II Special lecture II

Presentation Title
Dictionary Learning for biomedical image analysis

Speaker
정원기 (Prof. Won-Ki Jeong) / UNIST, Korea

Aug 2011 ~ Present Associate Professor, School of Electrical and Computer Engineering Ulsan National Institute of Science and Technology Leading High-performance Visual Computing Laboratory(HVCL)

In this talk, I will introduce convolutional sparse coding, which is one of the growing machine learning techiques, and its application in biomedical image analysis. Dictionary learning is a data-driven approach that decomposes the input image into basic components, i.e., atoms, and a sparse code, which is used to combine atoms to approximates the input image. The conventional dictionary learning samples fixed-size patches from the input image to generate the dictionary, which results in growing number of atoms to represent similar features that are slightly offset from each other. Convolutional sparse coding, on the other hand, is using a convolution operation so that the atoms (i.e., filters) can represent shift-invariant features, which allows to construct more compact dictionary compared to patch-based learning methods. In addition, since convolution can be efficiently implement in the frequency domain as a per-pixel multiplication, it maps well to the operations in K-space MRI data. In this talk, we will briefly review the dictionary learning and convolutional sparse coding theory, and explore some recent research results in biomedical image analysis, such as compressed sensing MRI reconstruction and cellular image segmentation.

The 55th Congress of The Korean Association of Maxillofacial Plastic and Reconstructive Surgeons

심포지엄 Ⅰ / Symposium Ⅰ

Symposium Ⅰ

- Speaker : Prof. Masayuki Takano
- Topic : How to educate the recent young doctor

Symposium Ⅰ

- Speaker : 김영준 (Dr. YoungJune Kim)
- Topic : 3D medical software techniques and the applications

Symposium Ⅱ

- Speaker : 이우정 (Prof. WooJung Lee)
- Topic : Surgical skills trainer and simulator

Symposium Ⅱ

- Speaker : 권용대 (Prof. Yong-Dae Kwon)
- Topic : Surgical training with a visuohaptic device in OMFS

◈ 심포지엄 I Symposium I

Presentation Title
How to educate the recent young doctor

Speaker
Prof. Masayuki Takano / Tokyo Dental College, Japan

2013 ~ Professor, Dept. of OMFS, Tokyo Dental College Suidobashi Hospital
2016 ~ Executive board of Japanese Society for Jaw Deformities

Medical education to young doctors is one of the important roles for OMF surgeons who should be trained not only broad knowledge of medicine but also safety surgical technics. Especially surgical trainings are difficult problems because surgeries in real operation room should be only constrained trainings for the young doctors in many situations. Traditionally, as we know, surgical trainings have been studied personally and have carried on from master hands to pupil hands by strict apprenticeship. We know it is not fully outdated way, but recent young students and residents are not always prefer to hard process like that.

On the one hand, surgical procedures nowadays in the fields of plastic and reconstructive surgery are changing with innovations of medical procedures. Those innovative changes will need makeover of educational methods for surgery. Recent rapid advances of digital technology as typified by 2D and 3D imaging, real-sized 3D modeling and virtual reality system are playing considerable roles for surgical trainings. Recently, we also ordinarily use digital technological tools for educations and surgical training of the orthognathic treatment and the reconstructive surgery for young doctors and trainees in our OMS department.

At the first step on a surgical treatment of jaw deformity, a young doctor makes cephalometric analyses on PC software (ex, Quick Ceph). As next step, after loading CT/DICOM data to PC software (ex, mimics), he simulates surgical planning for the surgical case. In this working process he can configure and study proper osteotomy lines with his tutor or trainer and he can also be aware of moving distances and cutting zones of bone segments. Next step is a real-size model simulation using real-sized 3D models made by 3D printer (ex, Stratasys). On these models he can move and fix the bone segments to the position that he had set from 2D and 3D analyses. And at this step, if the simulative model-operation is done on the premise of real surgical operation, he can also make pre-bended mini plates for fixtures. In some difficult cases we will make surgical guide for osteotomies.

For personal surgical training, he can watch the HD movies that record his tutor's surgeries or his previous training surgery. In 3D movie, he can use 3D monitor with glasses or head-mount 3D display for training as virtual reality (VR).

In recent years, various virtual training systems are tried in a lot of medical fields, especially endoscopic surgery, microscopic surgery and laparoscopic surgery. It is need to establish useful vertical training systems orthognathic surgery and reconstructive surgery in head and neck.

◈ 심포지엄 Ⅰ Symposium Ⅰ

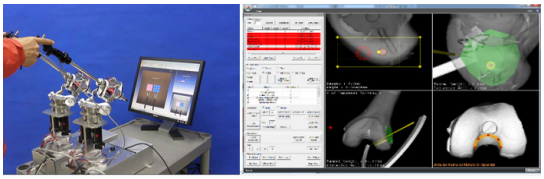
Presentation Title
3D medical software techniques and the applications

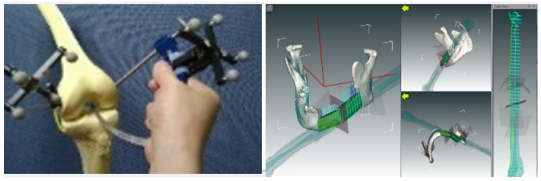
Speaker
김영준 (Dr. YoungJune Kim) / KIST, Korea

Sep. 11 ~ present Korea Institute of Science and Technology, Seoul, Korea Senior Researcher at Center for Bionics
Adjunct Professor at University of Science and Technology

최근, 수술 전 가상 수술 계획 수립, 영상 유도 수술, 로봇 수술 등, 수술 결과 및 환자의 안전을 제고하기 위하여 많은 노력이 시도되고 있다. 이러한 새로운 수술 기법들을 위하여서는 3차원 의료영상 소프트웨어 기술이 필수적이다. 본 강연은 3차원 의료영상 소프트웨어에 관한 최신 연구동향을 다룬다. 강연의 주된 주제는 3차원 수술 전 계획 수립, 환자 영상 모델링, 의료영상정합, 수술 내비게이션, 3차원 수술 후 분석, 가상 수술 시뮬레이션 등이며, 3차원 기반 뇌수술 및 정형외과 수술을 포함한 다양한 응용 사례를 소개할 예정이다. 또한, 복강경/관절경 수술 훈련을 위한 가상 훈련 시뮬레이션 기술 개발 사례를 소개할 것이다. 강연의 마지막에서는 현재 진행중인 악안면 재건수술을 위한 3차원 가상 수술 계획 및 수술 가이드 설계 기술에 대해 소개하고자 한다.

To enhance the surgical outcome and patient safety, many new technologies are being applied to surgeries such as virtual surgical planning, image guided surgery, and robotic surgery. For these new surgical technologies, 3-dimensional medical image software techniques are essential. In this talk, I will introduce the state-of-art 3D medical image software techniques. Main topics of the talk include 3D pre-operative planning, segmentation, registration, surgical navigation, 3D post-operative analysis, and virtual training simulation. Various applications using the 3D medical image software techniques will be presented including 3D-based brain and orthopedic surgical systems. I will also introduce how I developed virtual training simulation techniques for laparoscopic/arthroscopic surgical training. At the end of the talk, ongoing project of my research team will be introduced: 3D virtual surgical planning and surgical guide design for maxillofacial reconstruction surgery.





◈ 심포지엄 I Symposium I

Presentation Title
Surgical skills trainer and simulator

Speaker
이우정 (Prof. WooJung Lee) / Yonsei Univ., korea

Professor, Department of Surgery, Sincheon Severance Hospital
Yonsei University College of Medicine
Former President of Korean Association of HBP surgery

In recent years there has been both a paradigm shift in the way surgery is carried out and also in the way in which we train health professionals undertaking interventional procedures. Endoscopic procedures have replaced many traditional operations and the benefits of such an approach to patient care are well documented. However, evidence exists of higher patient complications during a surgeon's learning curve in endoscopic surgery, and it is now considered essential that endoscopic skills are learned in training laboratories rather than on patients. A new model of structured education, where surgical skills are practiced on models and virtual reality simulators, is set to replace the traditional apprenticeship model of training. Simulation is a rapidly evolving field that can provide a safe and increasingly realistic learning environment for trainees to practice in. This paper explores the current role of simulation in endoscopic training and provides a review of the developments in the field, including advances in simulation technology, progress in curriculum design and the use of simulation in nontechnical skills training Introduction Endoscopic surgery has had a significant impact on the delivery of surgical care, with endoscopic management now the gold standard treatment for a large number of conditions. In parallel with the dramatic changes seen in the way we operate, there has also been a paradigm shift in the way we train surgeons and other health professionals undertaking procedures. The skills required for endoscopic surgery are markedly different from those employed in open surgery, and achieving proficiency in such procedures is often associated with a prolonged learning curve. It has been demonstrated that endoscopic surgery is associated with longer operating times and a higher rate of complications during this learning curve. This finding along with pressures from service targets, reduced training opportunities and the ethical imperatives that have made it unacceptable for novices to learn "on patients" mean that the traditional "see one, do one" apprenticeship approach to surgical skills training is no longer considered tenable. If adequate experience can no longer be gained wholly through operating, effective adjuncts must be found. As a result of these considerations, it is generally proposed that endoscopic skills are initially learned in training laboratories prior to entering the operating room or procedure suite.

◈ 심포지엄 Ⅰ Symposium Ⅰ

Presentation Title
Surgical training with a visuohaptic device in OMFS

Speaker
권용대 (Prof. Yong-Dae Kwon) / Kyunghee Univ., Korea

Professor, Dept. of Oral & Maxillofacial Surgery, Kyung Hee University School of Dentistry
2006. 11 ~ Present ITI Fellow (International Team for Implantology)

Unlike extremities, craniofacial skeleton has more complicated structure and the number of consisting bone is also more than that of extremities. Craniofacial structure has various functions such as speaking, eating and communication with others. Because of the structural complexity, rehabilitation of maxillofacial area has been one of the major topics in maxillofacial surgery. This complexity prompted to adopt advanced imaging technology including 3-dimensional reconstruction of the computed tomography (CT) and stereolithographic models.

For decades, 3 dimensional CT scans, surgical planning using virtual reality, haptic technology and biorobotics have emerged as innovations in medicine and dentistry.

Computer aided surgery (CAS) gets popular and there are several commercial softwares for the planning of dental implants and orthognathic surgery. However, these softwares are made mainly for surgical guides and setting up surgical plans. Exploiting computer-based technologies, it is being expected that realistic surgical simulator will be developed.

For the surgical training, simulators have been used but those are usually for endoscope-based surgeries. In complex cases of facial trauma, preoperative rehearsal can give more confidence to surgeons and such surgical rehearsal unit can be beneficial to trainees.

We have been working on CAS focusing on the development of 3-dimensional visuohaptic surgical simulators such as tympanomastoidectomy simulator. Harmonious cooperation between the two quite separate disciplines would make this happen.

National Dental Board Exam will start out practical exam session presumptively from 2018 and traditional mock-ups will be used for the exam. Visual dental training system from Moog can replace such old fashioned mock-ups with computer-based simulators.

In this presentation, we are going to talk about the recent advances of virtual realism for dental and maxillofacial surgery practice .

심포지엄 Ⅱ / Symposium Ⅱ

Symposium Ⅱ

- Speaker : Prof. Zhigang Cai
- Topic : Digital surgery techniques used in craniomaxillofacial reconstruction

Symposium Ⅱ

- Speaker : 이종호 (Prof. Jong-Ho Lee)
- Topic : Computer-based functional and esthetic reconstruction of mandibular anterior arch defect: 3D analysis of airway anatomy in patients with mandibular anterior arch reconstruction:

Symposium Ⅱ

- Speaker : 김형준 (Prof. Hyoung Jun Kim)
- Topic : Microvascular Free flap transfer in compromised vessel depleted nack

◈ 심포지엄 II Symposium II

Presentation Title

Digital surgery techniques used in craniomaxillofacial reconstruction

Speaker

Prof. Zhigang Cai / Peking Univ., China

Assistant dean of Peking University, School and Hospital of Stomatology
Chairman of Chinese AOCMF board; Vice chairman of 3rd Asia Pacific Federation Society Reconstruction and Microsurgery

The craniofacial hard tissue defect caused by head neck ablative tumor surgery, osteomyelitis or severe trauma would physiologically and psychologically affect patients' life quality. However, the complexity of this regional anatomy makes it a great challenge for plastic surgeons to reconstruct the facial contour and rehabilitate the occlusion function. Nowadays, functional and aesthetic rehabilitation of the patients have become a basic goal for clinicians.

Over the past 30 years, the digital surgery techniques have been widely spread all over the world, more and more attention has been paid to the individual and functional craniofacial bone reconstruction. With modern digital surgery techniques, including computer aided design and computer aided manufacture (CAD/CAM), rapid prototyping (RP), reverse engineering (RE) and surgical navigation, the individual bone model can be fabricated based on computed tomography (CT) data, which is valuable for the shaping procedure of the bone graft. Also, the software programs can enable the clinician to operate virtully before the surgery, progressing from simple 2-dimensional images to sophisticated 3-dimension surgical simulation covering intraoperative procedures. The surgical simulation with 3-dimension stereolithographic model helps to establish confidence for the operator, improve the young clinicians' surgical skills, and make the operation visualized for patients.

The surgical techniques are usually combined to achieve a better outcome for patients, it can dramatically improve the safety and precision of the plastic surgery, achieving a designed purpose of both facial contour recovery and occlusal rehabilitation. With the rapid development of computer techniques, new digital surgical techniques are seen to be created, so it's believed that the individual and functional craniofacial bone reconstruction is to be achieved precisely according to the pre-operation planning in the future.

◈ 심포지엄 II Symposium II

Presentation Title

Computer-based functional and esthetic reconstruction of mandibular anterior arch defect: 3D analysis of airway anatomy in patients with mandibular anterior arch reconstruction:

Speaker

이종호 (Prof. Jong-Ho Lee) / Seoul National Univ., Korea

2004. 12 ~ Present Director, Oral Cancer Center, Seoul National University Dental Hospital, Seoul, Korea

The reconstruction of mandibular anterior arch defect following trauma, osteoradionecrosis and tumor ablation is challenge to maxillofacial surgeon. The U-shaped mandible is difficult to reconstruct morphologically. Furthermore, functional restoration is hard to obtain due to the extrinsic tongue muscles are originated from mandible anterior portion.

Fibula free flap is mainly used and accepted choice of the reconstruction of the anterior mandibular defect. But, almost literature reviewed some reports and there was rare of long-term follow-up data and evaluation of functional and esthetic analysis.

The purpose of this study was to analyze functional results especially focused on the airway change in the anterior part of mandible reconstruction. Forty eight patients of anterior arch reconstruction with pre- and postoperative CT scans were included and parameters of airway were analyzed.

The retroglossal (RG), Retroglossal lateral dimension (LAT), RG-cross sectional area(CSA) were significantly decreased in the post-operation patient($P<0.05$). Airway length (UI) was significant increased compared with pre-operation patient. Furthermore, RG has a positive relationship with airway volume (r=0.517) ; HP has a stronger relationship with airway volume(p=0.627) EB-area and RG-area have a strongest relationship (r=0.887 & r=0.906); also, On multiple regression analysis, RG-area(p=0.017) and EB-area had positive correlation with the post-operation airway volume.

The result of this study indicate that the airway volume change is associated with HP, EB-area, RG-area; but retroglossal (RG), retroglossal lateral dimension (LAT), RG-cross sectional area(CSA) were significantly decreased in the post-operation patient comparing with pre-operation patient. This indicates great care about this area is necessary during mandibular anterior arch reconstruction.

◈ 심포지엄 II Symposium II

Presentation Title
Microvascular Free flap transfer in compromised vessel depleted nack

Speaker
김형준 (Prof. Hyoung Jun Kim) / Yonsei Univ., Korea

Professor and Chairman in Oral and Maxillofacial Surgery
Yonsei University College of Dentistry, Seoul, Korea
2013. 9 Visiting Professor, Technical-University Hospital, Munich, Germany

미세혈관화 유리조직판 이식술은 구강악안면 영역 결손의 재건에 널리 이용되는 술식으로, 이의 성공에는 미세혈관문합에 적합한 수여부 혈관이 필수적이다. 그러나 기왕에 경부청소술을 받았거나, 유리혈관화조직판이식수술이 실패한 적이 있거나 또는 항암방사선 치료의 병력이 있는 등 미세혈관문합 이용할 수여부 혈관이 결손 혹은 적절하지 않은 상황을 종종 겪게 된다. 그러나 결손의 기능적 재건을 위해 미세혈관화 유리조직판 이식이 최선의 치료법이라면 이러한 난관을 극복하여 더 나은 치료결과를 얻기 위한 노력이 필요하다. 따라서 증례들을 통해 대체 혈관의 탐색 등 극복방법을 제시하고자 한다.

Microvascular free flap transfers are widely used procedure for functional reconstruction of head and neck defect. For successful free flap transfer, presence of adequate recipient vessels for microanastomosis is indispensable.

However, patients with history of previous neck dissection, failed free flap transfer or irradiation therapy may show lack of recipient vessels or inappropriate conditions for microanastomosis. Therefore, free flap transfer in such compromised vessel depleted neck might look impossible.

This presentation is aimed to help overcome compromised situations discussed above with couple of clinical cases.

심포지엄 Ⅲ / Symposium Ⅲ

Symposium Ⅲ

- Speaker : Prof. Toshinori Iwai
- Topic : Computer assisted surgical simulation and surgery in orthognathic surgery

Symposium Ⅲ

- Speaker : 양병은 (Prof. Byoung-Eun Yang)
- Topic : Customization, 3D Printing Guides and Computer-aided Surgical Simulation for Orthognathic Surgery

Symposium Ⅲ

- Speaker : 정영수 (Prof. Young-Soo Jung)
- Topic : Pre and postoperative 3D assessment in orthognathic surgery

◈ 심포지엄 Ⅲ Symposium Ⅲ

Presentation Title
Computer assisted surgical simulation and surgery in orthognathic surgery

Speaker
Prof. Toshinori Iwai / Yokohama City Univ., Japan

2012 ~ Present Assistant Professor in Oral and Maxillofacial Surgery /Orthodontics, Yokohama City University Hospital, Yokohama, Japan

Recently, computer assisted surgery (CAS) has been introduced in oral and maxillofacial surgery, and has also been applied to orthognathic surgery. Some simulation software such as Dolphin 3D surgery (Dolphin Imaging & Management Solutions) and PROPLAN CMF (Materialise) can allow three-dimensional (3D) hard and soft tissue simulation including evaluation of bony interferences and correction of asymmetry. Additionally, 3D printer can provide surgical guide and wafer as well as 3D skeletal model. I report computer assisted surgical simulation and in-house 3D printing for orthognathic surgery in Yokohama City University Hospital.

Furthermore, I am interested in possibility of iatrogenic obstructive sleep apnea (OSA) after orthognathic surgery. Narrowing of the pharyngeal airway space (PAS) after orthognathic surgery has been implicated in the development of OSA, and thus has received increasing attention in recent years. Many studies have assessed PAS changes after orthognathic surgery, however most investigated the PAS only morphologically, using lateral cephalogram and/or computed tomography, and morphological analyses cannot show the airflow condition or airway pressure. Narrowing of the PAS leads to increased airflow velocity and subsequently to further reduction in intraluminal pressure and further pharyngeal narrowing. Airflow simulations using computational fluid dynamics (CFD) have recently been applied to patients with OSA. The information provided by CFD can help clarify the pathogenesis of OSA, and CFD analysis has been combined with pharyngeal airway geometries obtained before and after treatment to determine the effects on parameters such as pressure drop and flow resistance. However, few studies have used CFD to assess the possibility of OSA caused by mandibular setback surgery. Therefore, I describe new information of CFD study in mandibular setback surgery.

◈ 심포지엄 Ⅲ Symposium Ⅲ

Presentation Title

Customization, 3D Printing Guides and Computer-aided Surgical Simulation for Orthognathic Surgery

Speaker

양병은 (Prof. Byoung-Eun Yang) / Hallym Univ., Korea

Assoicate Professor, Div. of Oral and Maxillofacial Surgery, Hallym Univ. Hospital

난해한 안면부의 해부학적 구조로 인해 구강악안면외과수술은 복잡할 수 있다. 이에 외과의사는 CBCT영상과 소프트웨어를 이용하여 각 환자에 맞는 가상 삼차원모델을 진단에 이용하고 있다. 이 것을 통해 정확한 계측이 가능해지고 가장 적당한 수술법을 선택하게 되어 각 환자에 최적을 결과를 얻을 수 있다. 더 나아가 환자 맞춤형 가상수술을 시행할 수 있고 이 가상 수술은 수술장에서 실제 환자의 경조직과 연조직에 적용되게 된다.

악안면외과수술 중 악안면교정수술의 성공을 위한 요소는 여러 가지가 있을 수 있다. 정확한 치료계획이 가장 중요하다. 골편이 움직이고 고정했을 때 안정적인 교합이 될 수 있도록 수술 전 교정이 충분히 이뤄져야 할 것이다. 다음은 수술 전에 세운 계획대로 수술장에서 골절단과 골편의 이동이 이뤄져야 한다. 전통적인 방법은 교합기에 치아모델을 마운팅하고 paper surgery를 기초로 model surgery를 시행한 후 intermediate wafer와 final wafer를 제작하는 것이다. 그러나 환자의 상태는 제 각각이고 치아모델을 마운팅하는 과정부터 오차가 발생할 수 있다. 특히 안면비대칭이 두개골부터 시작되는 경우 그 오차의 범위는 증가한다.

우리는 최근 FaceGide® 모듈을 만들고 이를 토대로 다양한 증례에 적용을 시행했다. Virtual Surgery를 기초로 3D printing을 이용해 osteotomy guide 및 screw insertion guide를 제작하고 CAD-CAM을 이용한 customization도 시도되었다. 이를 토대로 다소의 지견을 얻은 바 보고하는 바이다.

Oral and Maxillofacial surgical operations are complex due to complicated anatomical structures of the face. Therefore, Surgeons use CBCT images and specialized software to make a virtual three dimensional image for patient's surgery. This allows our team to thoroughly simulate each step of the surgery and determine the optimal technique as well as exact measurements, needed to achieve the good outcome for that patient. This customized virtual operation plan is then precisely translated to the patient's bone and soft tissue in the operating room.

There are several elements in the success of orthognathic surgery. The exact treatment plan is most important. In order to be stable occlusion when the bone segments are moved, pre-operative orthodontic treatment must be made sufficiently. Next, the movement of segments and osteotomy should be performed in the operating room as pre-surgical planning. In conventional method, Dental casts were mounted to the articulator. Intermediate wafer and final wafer were fabricated after the enforcement of the model surgery on the basis of the paper surgery. However, the patient's conditions are different, there will be errors resulting from the process of mounting the dental casts. Especially, the range of the error increases, when the facial asymmetry is initiated from the skull.

We create a FaceGide® module, orthognathic surgeries were performed in a variety of cases according to virtual planning. We prepared the osteotomy guide and screw insertion guide using the 3D printing technology based on the virtual planning and Customization of using the CAD-CAM also have been tried. We have gained some knowledge and report some cases.

◈ 심포지엄 Ⅲ Symposium Ⅲ

Presentation Title

Pre and postoperative 3D assessment in orthognathic surgery

Speaker

정영수 (Prof. Young-Soo Jung) / Yonsei Univ., Korea

Mar. 2014 ~ Professor, Dept of Oral & Maxillofacial Surgery, Yonsei University Dental Hospital and College of Dentistry, Yonsei University

악교정 수술의 목적은 환자의 기능과 안모 개선에 있다. 정확한 진단과 치료 계획 수립이 성공적인 수술 결과를 위해 필수적이다. 악교정 수술에서 진단은 임상적, 방사선학적, 치아 모형 분석을 통하여 이루어진다. 이러한 2차원 기반의 진단 방법을 통하여 오랜 기간 동안 비교적 양호한 수술 결과를 얻어왔으나, 2차원적인 정보를 얻는 과정에서 악안면 영역의 해부학적 구조물에 대한 많은 정보를 놓치게 된다는 한계점이 있다. 이로 인해 일부 환자에서는 기대치 않았던 치료 결과를 얻게 되기도 하였다.

컴퓨터 기술과 영상 기술의 발달은 악교정 수술 영역에 3차원 가상 진단의 적용을 가능하게 하였으며, 이로 통해 패러다임의 변화를 가져오게 되었다. 컴퓨터 단층 촬영 기술의 발달로 악안면 영역의 구조물을 3차원적으로 정확하게 시각화하는 것이 가능해졌으며, 골격과 연조직의 변화를 3차원적으로 분석하는 것도 또한 가능하게 되었다. 이러한 3차원 가상 진단에 더불어서 악교정 수술용 교합 장치의 제작도 3차원 정보를 기반으로 제작이 가능하게 되어, 컴퓨터 소프트웨어 상의 가상 진단을 수술방에서 정확히 재현할 수 있게 되었다. 또한 3차원적 중첩과 분석 도구를 이용하여 수술 결과를 평가하는 것도 더 용이해졌다. 수술을 통해 이동된 골편과 안면 연조직의 변화에 대하여 공간적인 이해도를 높일 수 있기 때문이다.

이번 강연에서는 3D 분석과 가상 수술의 원칙을 토대로 기존 분석법의 한계에 대하여 논하고, 3D 기술을 이용한 악안면기형의 치료에 대하여 중점적으로 다루고자 한다.

Orthognathic surgery aims to improve both the function and facial appearance of the patient. Precise diagnosis and treatment planning is essential for successful surgical outcomes. Treatment planning in orthognathic surgery has been based on a combination of clinical, radiological and plaster dental model analysis. Although this 2-dimensional method has showed good surgical outcomes, it is limited because much of the 3-dimensional structural information of the maxillofacial anatomy is lost during the 2D data acquisition. Due to this limitation, the treatment results in some cases were unexpected.

Advances in computers and imaging have permitted the adoption of 3D virtual planning protocols in orthognathic surgery, which may allow a paradigm shift. Computed tomography technology has expanded diagnostic capabilities by making it possible to visualize maxillofacial anatomy accurately and to perform 3D analysis, such as that of the changes in relationship of skeletal structures and facial soft tissues. In addition to 3D virtual planning, the surgical wafers also can be generated from 3D datas which can transfer the virtual planning to operation room properly.

Furthermore, 3D technology can contribute to a better understanding of the spatial relationships of the bony segments and facial soft tissues resulting from surgery by providing 3D superimposition and analysis tools. In this presentation, the limitations of traditional analytic method will be discussed with the principles of 3D analysis and simulation surgery. The focus will be on the treatment of dentofacial deformity and postoperative evaluation using 3D technology.

심포지엄 Ⅳ / Symposium Ⅳ

Symposium Ⅳ

- Speaker : Prof. Michael Yuanchien Chen
- Topic : "TENT POLE" GRAFTING for Complicated Alveolar Defects

Symposium Ⅳ

- Speaker : 이대희 (Dr. Deahee Lee)
- Topic : The application of rhBMP-2 to implant treatment

Symposium Ⅳ

- Speaker : 권경환 (Prof. Kyung-Hwan Kwon)
- Topic : Three-Dimensional Prining of rhBMP-2-Loaded LFA Collagen Scaffold with Long Term Delivery for Enhanced Bone Regeneration.

◈ 심포지엄 Ⅳ Symposium Ⅳ

Presentation Title

"TENT POLE" GRAFTING for Complicated Alveolar Defects

Speaker

Prof. Michael Yuanchien Chen / Taichung China Medical Univ., Taiwan

2010 ~ Chairman, Department of Dentistry,
Taichung China Medical University Hospital. Taiwan.

2002 ~ Chief, Division of Oral and Maxillofacial Surgery,
Taichung China Medical University Hospital. Taichung City, Taiwan.

"TENT POLE" concept for reconstruction of severely resorbed mandible as an adjunct procedure of complicated implant restoration was first advocated by Prof. Robert E. Marx who published a series of 64 consecutive successful cases through submental approach in the year 2002. However, in my hand, the "Tent Pole" grafting concept could also be extrapolated in atrophic upper & lower jaws with significantly vertical dimensional loss through intraoral approach either by para-crestal or vestibule incisions. Of all the biomaterials serving as "Tent Pole", I'd like to introduce autogenous iliac "J-Bone Block" which is basically an onlay bone graft harvested from anterio-medial aspect of ilium. It allowed contour adjustment only by simple hand instruments such as rongeur or bone cutter, to be secured properly and intimately at recipient site by one mini-screw on each bone block so that transverse & vertical alveolar ridge augmentation could be achieved simultaneously. According to the differences of Pre-Op & 6 months Post-Op CBCT images calculated by computer software, "Mimics", the average early volume shrinkage of the transplanted iliac J-Bone Blocks is about 17.3% with usually more than enough ridge volume left for placing regular diameter dental implants at ideal location and axial alignment. Subsequent overall survival rates of all these implant supported restorations are high above 95% in this author's case series.

◈ 심포지엄 Ⅳ Symposium Ⅳ

Presentation Title
The application of rhBMP-2 to implant treatment

Speaker
이대희 (Dr. Deahee Lee) / Seoul dental clinic, Korea

Adjunct Professor, College of Dentistry, Seoul National University
Adjunct Professor, Sanggye Paik Hospital, Seoul
Director of Seoul dental clinic

rhBMP-2를 이용한 tissue regeneration은 2000년대 중반에 미국 Medtronic 회사에서 Infuse를 FDA에 허가를 받기 시작하면서 공식적으로 사용을 하기 시작하였으며, 2010에 미국에서 매년 열리는 BMP symposium을 개최함으로써 적극적으로 rhBMP-2의 사용 빈도가 증가하는 것으로 알고 있다.

rhBMP-2를 제작하는 방식 중 E-coli를 사용하는 방식은 non-glycosylated form으로서, CHO-cell 방식에 비하여 less soluble 하며, 낮은 농도의 BMP-2를 요구하며 scaffold로부터 release control이 상대적으로 잘 되는 것으로 알려져 있기 때문에, 본 연자는 주로 E-coli 방식의 BMP-2를 이용하여 왔다. 하지만, 아직까지도 최적의 carrier는 확정되지 않은 상황이라서 여러 scaffold를 이용해서 임상에 적용하고 있는 실정이다.

본 강의에서는 한국에서 생산되고 있는 코웰메디의 rhBMP-2를 이용하여 임플란트 식립시 발생되는 peri-implant defect, peri-implantitis defect 및 future site development 등을 치료한 증례를 보여드리고, 본 연자가 생각하는 적정 농도와 적절한 technique 및 carrier에 대해서 보고할 예정이다.

Tissue regeneration using rhBMP-2 was officially used since the mid 2000s after Medtronic company got permission of infuse by the FDA. Furthermore, the use of rhBMP-2 has increased through the efforts of BMP symposium which is held in America every year since 2010.

Producing rhBMP-2 using E-coli is non-glycoylated form and less soluble than CHO-cell method, and can easily control the release of rhBMP-2 from scaffolds. Therefore, I prefer to use BMP2 using E-coli. However, the most ideal carrier is not yet found.

In this lecture, I'll show you some cases such as peri-implant defect, peri-implantitis defect and future site development which were treated with rhBMP-2 produced by Cowell-Medi company. I'll report the proper concentration of rhBMP-2, proper technique and carriers that I think about.

◈ 심포지엄 Ⅳ Symposium Ⅳ

Presentation Title

Three-Dimensional Prining of rhBMP-2-Loaded LFA Collagen Scaffold with Long Term Delivery for Enhanced Bone Regeneration.

Speaker

권경환 (Prof. Kyung-Hwan Kwon) / Wonkwang Univ., Korea

Director of Oral and Maxillofacial surgery Director of Wonkwang dental hospital

2016 present Member of Korean Academy of maxillofacial Plastic& Reconstructive Surgery. and Insurance director

Three-Dimensional printing-based scaffolds have demonstrated a remarkable potential for bone formation, regeneration and healing. Research interest in 3D printing-based scaffold is now focused on how to functionalize the scaffolds to accelerate the bone healing process. Recombinant human bone morphogenetic protein-2(rhBMP-2) is recognized as the most potent powerful osteoinductive ability. The rhBMP-2, which is clinically approved by the FDA, KFDA, has been used for various clinical application such as open fracture of mandible, osteomyelitis and osteonecrosis. Despite its efficacy, it has been reported that sustained and local delivery of rhBMP-2 using a suitable carrier is essentially required to accelerated bone healing.

Recently, a variedty of sustained rhBMP-2 delivery systems based on 3D printing technology have been introduced. The 3D printing-based collagen scaffold was immersed into rhBMP-2 solution for a delivery system. However, the dipping method could cause inconsistent loading quantity of rhBMP-2 in the scaffold and a waste of rhBMP-2 exceeding the amount necessary. We developed a 3D printing-based rhBMP-2 delivering scaffold only clinically relevent biomatrials and processes using a multi-head deposition system(MHDS).

We have studied Lidocaine-Fibrinogen-Aprotinin(LFA) collagen scaffold loaded rhBMP-2 in 3D printing-based tissue engineering system. Biphasic release of rhBMP-2 could continue for more than 21 days, and keep its osteoinductivity to induce osteogenic differentiation of bone cells. Especially, LFA collagen scaffold system can simultaneously achieve localized ling-term controlled relase of rhBMP-2 and bone regeneration, which provideds a promising route for improving the treatment of bone defects and bone diseases(osteomyelitis, BRONJ, MRONJ, osteoradionecrosis etc.)

심포지엄 Ⅴ / Symposium Ⅴ

Symposium Ⅴ

- Speaker : 최지윤 (Prof. Ji Yun Choi)
- Topic : Management of nasal deformities in Asian : How I do it

Symposium Ⅴ

- Speaker : 김인상 (Dr. In-Sang Kim)
- Topic : SMAS facelift techniques with their rationales

Symposium Ⅴ

- Speaker : 최진영 (Prof. Jin-Young Choi)
- Topic : Facial Contouring Surgery

◈ 심포지엄 V Symposium V

Presentation Title
Management of nasal deformities in Asian : How I do it

Speaker
최지윤 (Prof. Ji Yun Choi) / Chosun Univ., Korea

Jan. 2014 ~ Present Associate Professor
Department of Otorhinolaryngology
Chosun University College of Medicine, Gwangju, Korea

Principles for the surgical correction of the deviated nose

1. All deviated structures must be exposed through the open rhinoplasty approach especially high septal deviation exists due to the precise diagnosis and treatment
2. All deviated part of the mucoperichondrial attachment to the septum must be released
3. Deviated septum must be straightened while maintaining an at least 10mm caudal and dorsal strut
4. We should restore long term support with buttressing caudal septal batten or dorsal spreader cartilage grafts
5. Hypertrophied inferior turbinate should be treated
6. Precisely planned and executed external percutaneous osteotomies should be performed
7. Accurate preoperative planning and diagnosis are essential to successful outcome

Approach

1. Endonasal approach
2. Open rhinoplasty approach : wide exposure and accurate diagnosis

Surgical approaches to cartilaginous septal deformity

The surgical approach to revising a cartilaginous septal deformity can be performed through a “closed” incision or through a standard open rhinoplastic approach.

“Swinging Door” technique

Another closed technique introduce by Metzenbaum is called the “swinging door” in which a caudally deviated septum is released from the nasal spine and maxillary crest, adjustments are made to any excess of cartilage along the nasal floor, and the ventral caudal septum is “swung” to the other side of the nasal spine and sewn into place. This technique can be very effective for the ventral aspect of the caudal septum but does not change the inherent twist or bow of the septum. The nasal tip may remain deviated, and again, resupporting the nasal tip must be considered in this procedure.

Open approach

Due to the limitations of the closed approaches and the generally greater complexity in revising the cartilaginous septum, the authors primarily use the open approach. Most of the revision they see involve the caudal septum, and the authors commonly add spreader graft or make attempts to straighten the nose, which are accomplished with greater facility by the open approach. A standard inverted V transcolumellar incision is made, and dissection to expose the upper and lower lateral cartilage is completed. Meticulous dissection ensures to ensure exposure of the cartilage in the submucoperichondrial plane. Access to the complete dorsal and ventral aspects of the caudal septum and nasal spine is achieved. The mucoperichondria of both sides are dissected to release all forces of scarring and contraction. This is a tedious dissection but gives excellent visualization and aften allow simultaneous repair of perforations that may have resulted from primary septoplasty.

Reinforcement of L-strut

Any deviated portion of the quadrangular cartilage not occupying the L strut area are removed and maintained for grafting purposes, Reinforcing graft of harvested septal cartilage is suture across the deviation to maintain the correction and add support. The preferable graft is septal cartilage, but autologous rib, thin perpendicular plate of the ethmoid bone(PPE), donor rib, and Porex(Porex Corporation, Newman, Georgia) may also be used.

Extracorporeal septoplasty

A more common presentation is the patient who has a poorly supported nose and virtually no straight septal cartilage. In this case, extracorporeal septoplasty is advocated. This method involves removal of most of the septal cartilage after making careful measurements of the appropriate dorsal length and caudal height. A portion of the dorsal septum at the junction of the nasal bone(keystone area) is left intact to have an area to which to sew. The harvested cartilage is then carved and fashioned using suture into an adequate L strut and introduced back into the nose, securing it to the keystone area and upper lateral cartilage. The configuration is made such that the caudal strut also functions as a columellar strut and is sewn to the nasal spine in addition to the medial crus of the lower lateral cartilage for tip support.

Spreader graft

Cartilage interposed between septum and upper lateral cartilages with the membrane released inferiorly

Indication : camouflage effect, widening the nasal dorsum, improve the compromised nasal valve, straightening the septal strut

Graft material : septal cartilage, ethmoid bone, auricular cartilage

Unilateral or bilateral

Fixation graft material with bilateral upper lateral cartilage by absorbable material

◈ 심포지엄 V Symposium V

Presentation Title
SMAS facelift techniques with their rationales

Speaker
김인상 (Dr. In-Sang Kim) / Doctor Be: aesthetic clinic, Korea

Facial Plastic Surgery, Otolaryngolgoy training at Seoul National University Hospital
Clinical Instructor at Seoul National University Hospital
Visiting fellow at University of Pittsburgh, Medical Center

Facelift is the signature operation of facial rejuvenation, and it has been the epicenter of the beauty industry. Despite the introduction of less invasive surgical procedures and many nonsurgical modalities, nothing can match a facelift in its ability to return the basic architecture of the human face to a more youthful configuration.

Facelift surgery has evolved in parallel with understanding of the anatomy of facial aging. For over a century, a wide variety of approaches have been developed. There is no one correct way to perform a face lift. Rather, surgeons should be familiar with many different approaches to individualize their approach.

Asians are resistant to skin aging due to thicker dermis with greater amount of collagen. And darker pigmentation also provides protection against the photoaging. Therefore, skin thickness and quality remain fairly good with aging process. However, weaker facial skeletal support with heavier soft tissue makes the Asian face exposed to greater amount of gravitational force. Therefore, facelift for Asians need greater tissue suspension by extensive soft tissue undermining, proper dissection of SMAS layer.

The deep plane facelift entails more thorough undermining of ptotic tissue, works at the level at which mobility and aging laxity are occurring, thereby provides superior results to plication and imbrication techniques. It gives less “pulled” or “operated look”. Because it maintains the viscoelastic properties of the SMAS, it can provide longer maintenance of the result. Robust blood supply to the skin flap is another advantage. There is less risk of catastrophic issues of skin loss and poor scar appearance.

◈ 심포지엄 Ⅴ Symposium Ⅴ

Presentation Title
Facial Contouring Surgery in conjunction with Orthognathic surgery

Speaker
최진영 (Prof. Jin-Young Choi) / Seoul National Univ., Korea

2013. 5. ~ 2013. 6. Visiting professor in sleep center in Stanford University Hospital
2010. 5. ~ 2013. 5. Director in dept. Education and research in Seoul National University

Westernization of the criteria of facial beauty in Northeast Asia including China, Japan and Korea, the development of surgical technique for the facial bone surgery and anesthesiology increase the number of facial bone surgery including orthognathic surgery.

In clinical practice a lot of patients are looking for orthognathic surgery not because of mastication but because of facial aesthetics.

In general, facial bone surgery comprise orthognathic surgery which involves occlusion and facial coutouring surgery which change contour of face without occlusal change.

Orthognathic surgery is one of the most powerful aesthetic facial bone surgery. As maxillofacial surgeon we can improve facial aesthetics with the orthognathic surgery, but cannot complete facial beauty only with it. We can provide full scope of aesthetic facial bone surgery to the patients by the facial contouring surgery and orthognathic surgery.

In this presentation the concepts of contents and frame for facial aesthetics are explained and the effects of orthognathic surgery on facial aesthetics are evaluated. In addition, surgical techniques, possible complications and some cases about facial contouring surgery (Genioplasty, Mandibuloplasty, Malarplasty) will be explained and discussed

심포지엄 Ⅵ / Symposium Ⅵ

Symposium Ⅵ

- Speaker : 서병무 (Prof. Byoung Moo Seo)
- Topic : Simultaneous closure of hard palate and cleft lip

Symposium Ⅵ

- Speaker : 박영욱 (Prof. Young Wook Park)
- Topic : Surgical Principles in Primary Cheiloplasty for Minimizing Secondary Deformities.

◈ 심포지엄 Ⅵ Symposium Ⅵ

Presentation Title
Simultaneous closure of hard palate and cleft lip

Speaker
서병무 (Prof. Byoung Moo Seo) / Seoul National Univ., Korea

Aug. 2013 ~ present Chairman, Department of Oral and Maxillofacial Surgery
Seoul National University School of Dentistry, Seoul National University Dental Hospital, Seoul, Korea

구순구개열이 동시에 존재하는 환자에게 구순열의 수술과 구개열의 수술은 별도의 시기에 시행하는 경향이 있다. 구순열과 구개열을 동시에 시행하기에 환아의 상태가 장시간의 수술을 견딜 수 있는냐하는 문제와 합병증의 병발 가능성이 있어 개별적인 수술을 시행하는 것이 보편적이다. 그러나 구순열수술 시 경구개열의 폐쇄를 동시에 시행하게 되면 추후 연구개의 수술이 훨씬 경미한 수술로 바뀔 수 있는 가능성이 높아 추후 구개열의 수술이 편하게 된다. 또한 구개열수술이 간단해지므로 광범위한 조직 박리로 인한 조직판의 괴사나 비강-구강 누공의 발생빈도도 낮아지게 된다. 이는 추후 성장의 왜곡도 적게될 수 있는 장점을 가지고 있다. 그러나 구순열수술시 함께 시행하는 경구개열 폐쇄수술로 수술시간이 늘어나게 된다는 단점이 있다.

본 보고에서는 편측성 및 양측성 구순구개열 환자에게 적용된 구순열 및 경구개열 동시 폐쇄수술을 서골피판을 이용하여 시행한 결과를 보고하고자 한다.

Cleft lip is often operated in advance to cleft palate closure in most of cases. Longer time required to provide simultaneous operation for cleft lip and cleft hard palate closure, which may give an additional burden on the cleft babies. If hard palatal cleft can be closed at the same time in cleft lip operation, it gives some advantages to the patients and surgeons altogether: simplified soft palatal closure in later operation, no need extensive dissection of palatal flaps, less chance of flap necrosis, and less chance of oro-antral fistula formation. These factors contribute less morbidity to growth deterioration. The only shortcoming is more time required for simultaneous closure of cleft lip and cleft hard palate.

In this presentation, we would like to report some cases for simultaneous closure of unilateral and bilateral cleft lip and palate.

◈ 심포지엄 Ⅵ Symposium Ⅵ

Presentation Title

Surgical Principles in Primary Cheiloplasty for Minimizing Secondary Deformities.

Speaker

박영욱 (Prof. Young Wook Park) / Gangneung-Wonju National Univ., Korea

2013 ~ Present	Vice President, The Korean Association of Maxillofacial Plastic and Reconstructive Surgeons
2015 ~ Present	Vice President, Korean Cleft Lip and Palate Association

Cleft lip and palate is the most common congenital orofacial anomaly treated by oral and maxillofacial surgeons. For successful primary cheiloplasty for patients with cleft lip and palate, maxillofacial plastic and reconstructive surgeons need to understand pathological and 3-dimensional anatomy of the cleft lip, nose, and alveolus, as well as the effect of growth after the primary cheiloplasty.

Primary cheiloplasty in unilateral cleft lip deformity should restore normal functional and esthetic anatomical relationships in midface and maintain long-term symmetry. Regardless of the surgical method used, common surgical principles are to achieve adequate lip height and a favorable scar pattern (position of line of closure), to reconstruct nasal floor, and to restore muscular continuity and nasal and lip symmetry.

Recently, modern surgical goals and concepts of the bilateral cleft lip deformity are well known without major debates or disagreements. Widely accepted surgical principles in bilateral lip repair are maintaining or establishing symmetry, constructing a full median tubercle using lateral white roll and vermilion flap, deepening the gingivobuccal sulcus using premaxillary mucosa, establishing muscular continuity after controlling the projecting premaxilla, and correcting the nasal deformity simultaneously with the primary cheiloplasty.

But, unfortunately secondary cleft lip deformities such as excessive lip scar, short or long lip, tight lip in bilateral cleft lip, deformed orbicularis oris muscle, deformed or asymmetrical philtrum and vermilion, mismatched mucocutaneous junction, and anterior nasolabial fistula are common in children born with acleftlip and palate. Moreover, after primary cheiloplasty usually performed 3-5months after birth, the powerful variable of growth may finally distort the immediate surgical results.

To overcome these surgical and growth effects, sound surgical principles and fine surgical skills are required. In this presentation, the author will discuss optimal surgical principles in primary cheiloplasty for minimizing the number of secondary surgical interventions.

The 55th Congress of The Korean Association of Maxillofacial Plastic and Reconstructive Surgeons

Luncheon Seminar

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- Speaker : 김희진 (Prof. Heejin Kim)
- Topic : Clinical anatomy of face for Toxin and Filler Injection: MAXIMIZING the RESULT and SAFETY

◈ 런천세미나 Luncheon Seminar

Presentation Title

Clinical anatomy of face for Toxin and Filler Injection: MAXIMIZING the RESULT and SAFETY

Speaker

김희진 (Prof. Heejin Kim) / Yonsei Univ., Korea

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Anatomically, the face is the most complicated structure of the human body. Especially, the structure of facial muscles including nerves and vessels is very variable and has the racial differences. Recently, the importance on the facial anatomy has been reconsidered as the interest on the facial aesthetics is increasing. The aesthetic physicians should understand the anatomy of the facial musculature. Through this lecture, I would like to show the anatomical characteristics and the individual variations of the face related to the filler and Botulinum toxin injection for the safe and efficient clinical applications.

To avoid the serious complications after the injection, the detailed vascular anatomy of the face is essential. In this presentation, I would like to show (1) the whole running courses of the facial artery (FA) and superficial temporal artery (STA), (2) the origin and nature of the angular artery, (3) the layered location of supratrochlear and supraorbital artery at the forehead, (4) the vasculatures of the nose, and (5) the courses and distribution patterns of the labial artery around upper and lower lip. In every items of my presentation, the clinical importance of each area will be raised. In addition, I would like to suggest some injection techniques to reduce the vascular problems related with filler Injection as follows;

1) Small volume: Excessive amounts of filler should not be injected into one area. External pressure may increase causing damage to blood vessels.
2) Slow injection: Any filler injection should proceed slowly. A slow injection can reduce the risk of damaging vessels by a sudden increase in pressure
3) Retrograde injection: Anterograde injection increases the chance of intravascular injection.
4) Aspiration: Aspiration is the most effective method of verifying whether a needle or cannula is located within a vessel.
5) Use of cannula: Using a cannula of relatively large diameter reduces the chance of intravascular injection; however, it does not ensure complete safety.
6) Size of the needle and cannula: It is best to use a needle or cannula of sufficient size so that the pressure of injection is not high.
7) Avoid the vascular layer: It is best to inject into a layer with little to no blood vessels traversing. It is safest to inject into the subdermis or supraperiosteal level.
8) Anatomical knowledge: Above all, a thorough knowledge of the anatomy of the region being treated is necessary.

About the peripheral nerve distributions of the head, I will demonstrate that the demarcations of branches of the CN V (trigeminal nerve) and CN VII (facial nerve) anatomically overlap on some area of a whole face based on the Sihler's staining technique. Especially, I would like to talk about the general distribution and anastomosing patterns of the trigeminal and facial nerves. Through this lecture, the anatomical characteristics and the individual variations of the face related to the filler and toxin injection for the safe and efficient clinical applications will be given.