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SICOT E-NEWSLETTER

MARCH 2022

**SICOT
CONGRESS
NEWS**

**SICOT
EVENTS**

**SICOT BY
REGION**

**COMMITTEE
NEWS**

**SICOT
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**SICOT
PUBLICATIONS**

**EXPERT
CORNER**

**KNOWLEDGE
HUB**

Abstract
Submission
Deadline:
15 April

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Kuala Lumpur, Malaysia

SICOT²²

42nd Orthopaedic
World Congress

28 - 30 September 2022



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AIOT

Alliance of International Organizations of Orthopaedics & Traumatology



APOA



EFORT



PAOA



SICOT



SLAOT

Joint Statement Against War

March 4, 2022

The situation that creates consequences that orthopaedic surgeons have the most difficulty dealing with in their professional lives is war. APOA, EFORT, PAOA, SICOT and SLAOT are adamantly against war.

As AIOT, we express our belief in the right to sovereignty of every nation, and that the way to resolve conflicts between countries is through diplomacy and negotiations, not war.

Contributors (in alphabetical order):

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Onder Aydingoz (Past President, EFORT)
Mohit Bhandari (Chair, SICOT Research Academy)
Horacio Caviglia (President, SLAOT)
Ali Hassan Chamseddine (Past Vice President, PAOA)
David Choon (Past President, APOA)
Mohamed Darwish (President, PAOA)
Mahmut Nedim Doral (Immediate Past President, APOA)
John Dormans (Immediate Past President, SICOT)
Li Felländer-Tsai (President, EFORT)
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James Waddell (Secretary General, SICOT)

AIOT is the joint platform of the five leading international organizations of orthopaedics and traumatology. It was established to increase collaboration and to facilitate communication among the members in 2018.

AIOT member organizations (in alphabetical order):

APOA (*Asia Pacific Orthopaedic Association*)
EFORT (*European Federation of National Associations of Orthopaedics and Traumatology*)
PAOA (*Pan Arab Orthopaedic Association*)
SICOT (*Société Internationale de Chirurgie Orthopédique et de Traumatologie*)
SLAOT (*Sociedad Latinoamericana de Ortopedia y Traumatología*)



ASHOK JOHARI (INDIA)
SICOT President

Whither SICOT at 100?

Founded in 1929, SICOT will have completed its first centenary in 2029. Barely seven years to go! Where will SICOT be in 2029?

Our founding fathers established SICOT for advancing the art and science of Orthopaedics and Traumatology through education, research and strengthening of the bonds between orthopaedic surgeons globally. The broad objectives of SICOT remain the same. If so, what changes?

When SICOT was established, there were few orthopaedic associations around the world. Today each country has its own orthopaedic association and there are many global bodies focusing on different fields within Orthopaedics. National orthopaedic associations have ramified into major state associations and city chapters, all with objectives echoing those of SICOT. If so, how would SICOT remain relevant to the orthopaedic community?

For one, SICOT is still the only unique international organisation in Orthopaedics and Traumatology. It is a melting pot for orthopaedic surgeons from different nations and the diversity within SICOT is amazing. It remains as the only orthopaedic organisation with a universal view conferring an international flavour to its activities.

Major thrusts have been made in orthopaedic education and research by SICOT. Traditionally SICOT has hosted its world congresses annually since the last few decades. COVID brought about digital transformation in education as also research education and potentialities. With COVID slowing down, face-to-face activities are set to resume. Digital education must however continue for its convenience, especially for surgeons who may be unable to travel for conferences. Digital education needs strengthening to cater to organised courses and on-demand education with facilities for video-assisted learning and use of virtual reality.

By encouraging international collaborations, projects and multicentric studies, SICOT can make a thrust in the research arena. SICOT is of course encouraging research through grants and awards as well as research education and mentorship. If this thrust continues internationally, SICOT would be the only organisation to have such a big reach.

A thrust on developing the subspecialties will position SICOT as a general orthopaedic organisation with a specialist leaning. The culture for specialisation is an evolving trend and will be the demand of the younger surgeons. SICOT will encourage them by fellowships, hands-on training and eventual certification.

What about the membership of SICOT? Traditionally, orthopaedic surgeons with an international outlook favoured SICOT. Orthopaedic surgeons need to collaborate and team work with other disciplines like bio-engineers, basic scientists, rehabilitation specialists, therapists and nursing staff. It has become necessary for orthopaedic surgeons to be able to create teams and speak a common language with other disciplines and we must have such disciplines represented within SICOT by allied or affiliated membership. Their privileges and rights can be defined after giving the matter a good thought and discussing this with our membership. My feeling is that this will be a positive step generating transdisciplinary knowledge, communication and collaboration.

An area where SICOT is not represented strongly is 'Social Orthopaedics & Patient Care'. How can SICOT be taken to the masses who have some stake in orthopaedic issues? How can SICOT influence governments for implementing preventive strategies? How can SICOT influence the policymakers? Would they look upon SICOT as providing genuine guidance for policy shifts? Definitely, this is a direction in which we need to think deeply, especially when we have powerful and influential orthopaedic surgeons as members of SICOT.

By working in the thrust areas mentioned, I am sure that SICOT will be comfortably placed as a true and powerful patron for international orthopaedics by 2029, its centenary. It would truly be a century of meaningful existence!

A strategy meeting for the future direction for SICOT will be held in May 2022 by the SICOT Executive Committee. Suggestions are welcome from one and all.



SICOT CONGRESS NEWS



ABSTRACT SUBMISSION DEADLINE:

15 APRIL

**SUBMIT
YOUR
ABSTRACTS
HERE!**



Join us in
Kuala Lumpur,
a relaxed and
multicultural
city



SICOT EVENTS



K.H. SUNIL KUMAR (UNITED KINGDOM)

SICOT Young Surgeons Committee Chair

27th SICOT Young Surgeons International Meeting & 40th Cambridge Trauma & Orthopaedic Club Meeting

We would like to welcome you to the 27th SICOT Young Surgeons Meeting which will be held in collaboration with the 40th Cambridge Trauma & Orthopaedic Club Meeting. The meeting will be held in the historic city of Cambridge and promises to deliver a high quality scientific day with keynote speakers from around the world.

The theme for the meeting is "Innovation and Training" and we have an exciting thought-provoking programme reflecting the theme.

There are several sessions for you to present your work - four free paper sessions, two JAM (just a minute) sessions and a poster session. There is opportunity for everyone to get involved and actively participate in the meeting. This is an exciting opportunity for trainees, medical students and younger surgeons to interact and network with surgeons from around the world. In addition, we have planned debates, breakout sessions and keynote lectures which will definitely be stimulating. Also Cambridge is a university city and thriving hub for innovation, training and research. You would definitely enjoy visiting this lovely city and get inspired by a long tradition of research and innovation.

Please check out the video below to give you a glimpse of the city and the meeting.

We look forward to welcoming you to the SICOT Young Surgeons Meeting in Cambridge.



**27th SICOT Young Surgeons International Meeting &
40th Cambridge Trauma & Orthopaedic Club Meeting**

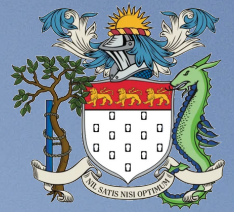
Cambridge, United Kingdom - 30 June & 1 July 2022 - Save the date!





27th SICOT Young Surgeons International Meeting & 40th Cambridge Trauma & Orthopaedic Club Meeting

Cambridge, United Kingdom - 30 June & 1 July 2022 - *Save the date!*



Cambridge
Trauma and Orthopaedic
Club

**SUBMIT YOUR
ABSTRACTS HERE
UNTIL 10 APRIL!**



REGISTER HERE!



NEWS FROM THE HEAD OFFICE

New Appointments

National Representatives



Jean-Emile
Bayiha
(Cameroon)



Mahmoud
Hafez
(Egypt)



Ghalib Ahmed
Al-Haneedi
(Qatar)



Norbert
Krajcsovics
(Slovakia)



Mahboub
El-Hashemi
(Sudan)

Education Academy Committee Chairs



Education
Arindam
Banerjee
(India)



Education Centres
Khaled
Emara
(Egypt)



Fellowships
Vojtech
Havlas
(Czech Republic)

Subspecialty Committee Chairs



Hand
Ferdinando
Da Rin De Lorenzo
(Italy)



Hip Arthroplasty
Oliver
Marin-Pena
(Spain)



Infections
Pietro
Ruggieri
(Italy)



Knee Arthroplasty
Ashok
Rajgopal
(India)



Microsurgery
Ahmad
Addosooki
(Egypt)



Trauma
Roman
Pfeifer
(Switzerland)

SICOT BY REGION



IN-HO JEON (SOUTH KOREA)

SICOT National Representative of South Korea

History of the Orthopaedic Specialty in Korea



History of Orthopaedics and SICOT in Korea

This article will give an insight into the history of the orthopaedic specialty in Korea and its emergence from a painful history.

Korea achieved independence after the end of the Second World War (1945), but due to a brutal civil conflict that followed between 1950 and 1953, the peninsula has been divided into North and South. Currently, it is the last remaining divided country in the world. During the Korean War, fixed military hospitals were created for the first time to treat war casualties, thereby enabling rapid medical and surgical intervention. Due to the enormous number of casualties, intramedullary nailing became the standard treatment for soldiers with lower limb long bone fractures during the Korean war. The surge in the number of orthopaedic trauma patients, resulted in the establishment of a dedicated training programme to create

orthopaedic specialists. In addition to the various musculoskeletal injuries, widespread malnutrition led to high rates of tuberculosis and polio, facilitating high demand for orthopaedic doctors. This laid the foundation for the establishment of the Korean Orthopaedic Association in 1956.

Surgical treatment for trauma patients as well as hip and spine deformities related tuberculosis patients paved the way for advancement in orthopaedics. As the country's economy grew, traffic accidents and industrial accidents took the major portion of practice and interest. More recently, the popularisation of knee arthroplasty in the 1990s and interest in sports medicine since the early part of the 21st century, are driving future progress in these fields. Sports medicine and arthroplasty attracted more orthopaedic surgeons after Korea hosted the soccer World Cup in 2002 and Winter Olympic Games in 2018.



Korean War (출처 : Wikipedia)

During the first decade of the 21st century, the number of scientific papers from South Korea, published in peer reviewed international journals exceeded 2,000, taking the country's ranking to the 5th in the world, thereby showcasing the tremendous progress made not only clinically but also in the field of research. The Korean Orthopaedic Association currently has over 7,800 regular members and over 900 trainees. The annual congress is well attended with a global participation, hosting around 100 international speakers who present scientific papers every year. Currently Korea is ranked seventh in the world in the field of science and technology. With the support of technology, it has been possible to conduct virtual scientific meetings through which we invite speakers to present on virtual mode and share and disseminate expertise from the best surgeons around the world. Biotechnology and clinical medicine are rapidly progressing enabling us to practice cutting edge medicine.



Current Seoul 2022

KOREA and its SICOT connection

The relationship between SICOT and Korea began in 1972 when the Korean branch was founded, and the relationship has strengthened since then. It was highlighted in 1993 when the SICOT World Congress was held in Seoul. At that time Korea had only 30 SICOT members, but with passion and dedication of president Byung Hoon Ahn and former president Chung-Bin Chu, the World Congress was hosted successfully. From 28 August to 3 September, over 5,000 members from 80 countries attended the SICOT 1993 Seoul World Congress, and 1,496 articles from 55 countries were presented. Three million stamps were issued for the celebration of the congress. To commemorate the event, the Korean Orthopaedic Association established the SICOT 93 Seoul Academic Award in 2002 and this award is presented in the annual congress of the KOA since then.



*SICOT newsletter introducing
SICOT 1993 Seoul World Congress*

SICOT played a major role in promoting the research achievements of the members of the Korean Orthopaedic Association to the world and it became the crucial liaison centre of international exchange and communication. In the beginning, KOA had limited academic exchanges with neighbouring countries like Japan and other Asian countries. However, SICOT provided a great stimulus to the academic development of KOA members, and the hosting of SICOT 93 in Seoul planted great pride and cemented confidence. Many Korean researchers participated and submitted their research works to International Orthopaedics, the official journal of SICOT. Now, SICOT Korea contributes to host travelling fellowships with the Asia Pacific Spine Society to share the experience and technology and support young surgeons.

Whilst strengthening the long-standing traditions of Korea and SICOT, efforts are being made to vigorously promote the creation of a venue for international exchange and education, which has been somewhat tempered by the COVID-19 pandemic. Especially, in order to provide many opportunities for exchange and education of those young surgeons and researchers, SICOT is actively forming a young surgeon committee, and KOA is also trying to create a more systematic international training environment by pursuing projects such as selecting an international fellowship centre.





MAHBOUB EL HASHEMI (SUDAN)

SICOT National Representative of Sudan

SICOT in Sudan



Knowledge Progresses Only When Shared, starting from this point I will go through some highlights in the history of SICOT in my country Sudan, early in this millennium a few number of Sudanese orthopaedic surgeons have gotten the chance to have their SICOT fellowship in Egypt very close to our homeland, and when they came back they have reflected what they have learned and that had made a difference in their own practice and in the overall orthopaedic services in the nation, but however, SICOT has not yet gained the deserved popularity among our national orthopaedic surgeons, and this is well reflected in the number of active members in my country.

Being recently elected for the National Representative post, I will be focusing on making SICOT more popular, growing our national community, launching courses, symposia, lectures, accrediting fellowship centres, making agreements with countries in our region to enhance training, and on reflecting the heritage of orthopaedic surgery in Sudan.

SICOT Sudan will not walk alone, and for that reason I have started to contact our national orthopaedic associations to arrange and cooperate in each subspecialty national programmes, including but not exclusive to regular workshops, annual conferences, audits, and training activities for residents and fellows, believing that creating such connections will help both of us to grow and provide our best for the surgeons as well as for the patients.

Finally, it is a great privilege to represent my country in this great society, and I along with my colleagues will spare no effort in making all of our goals come true, our SICOT family will grow, and we will be up to the challenge to achieve all what is possible and some of the impossible.

Meroe pyramids



COMMITTEE NEWS



MUSTAFA ALNAIB (UNITED KINGDOM)
SICOT Website Committee Chair

SICOT Website Committee

The Website Committee is the latest edition to SICOT's family. The idea for this committee was born out of the Governance Council in 2020 and the Chair role was advertised in September later that year. I was fortunate to be appointed as Chair in November 2020.

A vision was set from the start. SICOT's website is the digital image of this great organisation and the committee's role was to take that to the next level. Myself and the team focused on the following areas:

- A modern user interface and improved user experience
- Development of new features for the website
- Increase member engagement
- Empowering Women in Orthopaedics
- Providing value for all stakeholders (members, advertisers and the wider orthopaedic community)

Since November 2020 we have achieved the following:

- "[SICOT Diaries](#)": This is a new publication and website section where distinguished orthopaedic surgeons from around the world are invited to write a short article about experiences in their careers (storytelling, eureka moments, light-hearted, not meant to be educational)
- "[Women In Orthopaedics \(WiO\)](#)": This section is dedicated to articles submitted by female orthopaedic surgeons from around the world promoting the profession amongst women and reflecting on challenges and opportunities. The response has been overwhelming and also led to establishing new partnerships.
- "[SICOT languages](#)": A new feature developed for the website where visitors can browse website content in their own language using Google Translate as a native feature. We believe that SICOT is the first medical organisation to introduce such a feature on their website demonstrating its worldwide reach and inclusivity.
- "[Ortho Update](#)": A new feature that helps keep orthopaedic surgeons up to date with the latest published abstracts in renowned peer-reviewed journals.
- "[IT Skills for Orthopaedic Surgeons](#)": A workshop delivered by the committee at SICOT conferences. Our first workshop was in Budapest 2021.

It would not have been possible to achieve the above without the dedication and efforts of the committee members: Mustafa Alnaib (SICOT Website Committee Chair); Satish Kutty (Vice Chair and SICOT Diaries lead), Temiloluwa Olufemi (SICOT WiO blog lead), Ece Nur Cinar (Video and illustrations editor), Linda Ridefjord (Executive Director, SICOT Head Office)

Future plans for the committee include:

- Development of further features in liaison with other committees to promote content
- Work closely with the Education Academy on member's educational material
- Digitising the SICOT exam corner to provide access for SICOT members
- Reach out to the wider SICOT membership for ideas and contributions, especially to WiO and SICOT Diaries blogs

We are all excited about the future for SICOT's website and what it will deliver for the organisation and its members.



Mustafa Alnaib
(United Kingdom)



Satish Kutty
(United Kingdom)



Temiloluwa Olufemi
(Nigeria)



Ece Nur Cinar
(United Kingdom)



Linda Ridefjord
(Belgium)



TEMILOLUWA OLUFEMI (NIGERIA)
SICOT WiO Blog Lead

The Road Less Travelled: Lessons From a Year at the SICOT Women in Orthopaedics (WiO) Blog

'Although orthopaedic surgery is traditionally a road less travelled by women, we are not alone anymore'
Temiloluwa Olufemi, 2022

As a forward-thinking organisation, SICOT decided to embrace diversity and inclusion along with other global corporations for improved collaboration. So, I received an email from the SICOT Head Office in January 2021 nominating me to join the Website Committee, and lead a newly created column on the SICOT website for Women in Orthopaedics. It was hoped this would elevate SICOT's digital image and maintain her relevance as the leading international orthopaedic organisation.

This new initiative required all hands on deck so we set out to collate a database of SICOT women with help from the Head Office. It was alarming to find we had less than 70 SICOT women in orthopaedics (amidst over 2,000 male members). Our committee with the multitasking Ece Nur Cinar, hit the ground running with articles and videos from SICOT women across the globe to ensure the blog's success. In 2021, we featured women with varied backgrounds and orthopaedic specialties with awesome feedback. Please find previous blogs using this link: www.sicot.org/blog/88775.

I have learnt that our stories, while very unique and different, shared a striking resemblance: we walked alone. Trendsetters walking alone... pushing for our voices to be heard... personally driven to stay motivated and make an impact... but walking alone.

Now don't get me wrong. Being alone has its perks. Some of the world's best innovations were created by people who walked alone. But walking alone can be boring... and stifling... (and if we're being honest), tiring.

In December 2017, the SICOT e-Newsletter featured a special edition on Women in Orthopaedics where I wrote a bit about my journey (www.sicot.org/enewsletter-89-women-orthopaedics-4). Like most females in surgical specialties, I didn't stumble into orthopaedics. I made an informed decision. I vividly recall being wildly fascinated by orthopaedics during my medical school rotations, and once I chose the path, there was no going back.

But I was alone!

Alone... all through the residency training programme, during preparations for fellowship examinations and even today, as a practicing consultant. I recall attending professional courses and conferences as the sole female delegate amidst a sea of male heads. It was even less interesting being the only black female orthopaedic surgeon at some international courses and meetings.

So it is beautiful to see the story changing... (and heartwarmingly so!!)

At a recently concluded AO Alliance course on Paediatric Fracture Treatment for senior residents and consultants in Lagos, Nigeria, we had 8 female participants from different sub-regions in the country. We even had multiple participants from the same training institutions. Most of the faculty were actually amazed since they had not seen such a large number of female orthopaedic surgeons and trainees at a single course (...and I hadn't either).

And this story resonates across countries and continents. The narrative is changing. **We are walking together... and we are not alone anymore!**



Cross section of Nigerian Orthopaedic Women at the AO Alliance Paediatric Fracture Management course in Lagos

With the global paradigm shift towards diversity and inclusion, many organisations like SICOT, International Orthopaedic Diversity Alliance (IODA), and Women in Orthopaedics (WOW) have taken the lead in conversations to ensure increasing number of females and minorities in orthopaedics become the new norm (and not the 'old' anomaly).

I also learnt that we frequently shy away from telling our stories. When we started the SICOT WiO blog, we reached out to our database of SICOT women but only a few members gladly sent in their articles. Most members said they didn't even know where to start but, with further research, I found summarily that women (particularly women in orthopaedics) were just too shy to tell their stories.

Recently, a female medical student in the United States decided to swap orthopaedics for another specialty and a video was created to address medical students of diverse backgrounds choosing not to pursue orthopaedics (<https://vimeo.com/659413244/8132fbc1c5>). Imagine if she read your story on this blog (or elsewhere)... Imagine if she met you at work? Here's a true story: Recall I mentioned my fascination with orthopaedics as a medical student earlier? Well one lucky day, I assisted my professor in an ORIF with K-wires for a metacarpal fracture. During the surgery, he told me about Nigeria's first female orthopaedic surgeon in Lagos and I was hooked (#shedidsolcan). Few years ago, a female surgical resident liked orthopaedics but couldn't commit to the programme because she hadn't heard of (or seen) a female orthopaedic surgeon. She met me... and as they say, the rest is history.

So we need to tell our stories!

Our stories might be similar but each one remains unique - individually and collectively. And our stories can be likened to our voices. Meghan Markle aptly motivates all in this quote; 'Women do not need to find their voice, they should be encouraged to use it'.

The SICOT WiO blog encourages us, and gives an opportunity to use our voices by telling our stories in our own words. Special thanks to all our contributors who shared their remarkable stories with us in 2021. We are hopeful for more stimulating stories in 2022 and look forward to receiving your inspiring articles via website@sicot.org, and sicotwio@gmail.com.

Dear SICOT Woman, do remember The world is watching,
the world is listening... and we're not alone anymore!

SICOT PUBLICATIONS



AHMED ABDELAZEEM (EGYPT)
SICOT Editorial Secretary

Call for Applications



We are calling for new members of the Newsletter Editorial Board – Corner Editors.

1. What is the SICOT Newsletter?

The SICOT Newsletter is “the tongue” by which the Society decision-makers talk, and “the face” the society components show to the outside world. Currently, It comes out four times a year in an electronic format.

2. What are its corners?

Corner

Editorial

SICOT Congress News

SICOT Committee News

News from the Head Office

SICOT Events

SICOT by Region

SICOT Expert Corner

SICOT History

SICOT Publications

SICOT Education

SICOT Research

SICOT Review

SI-QUOTE

Goal/Description

Introductory article.

Updates and advertising of the annual Congress.

Updates on the past and current activities as well as the future of different committees.

Updates from the SICOT Head Office, for example new appointments and structural changes.

Advertise and update the worldwide events organised and endorsed by SICOT.

SICOT is a global organisation having several regional representatives and national delegates for over 100 countries. This section advertises and talks about their activities and future.

Scientific corner for the SICOT experts to share their experience and knowledge. All experts are invited to write and publish here. Subspecialties are invited to share their expert opinion.

Shares the history of our organisation using part of the book by Charles Sorbie or inviting one of the previous presidents of SICOT congresses to share congress memories and photos.

News from the chief editors of the International Orthopaedics journal and SICOT-J.

Covers news/updates about the SICOT Education Academy.

Covers news/updates about the SICOT Research Academy.

Reviews various SICOT activities that could benefit members, for example books, fellowships, apps, centres, papers, and so on.

Collects inspiring quotes.



3. What is the job description for corner editors?

"No one can do everything, but everyone can do something, and together we can change the world." ~ Ronald J. Sider

- Full responsibility for his/her section for one year.
- Formulation of a yearly plan for the corner sequence and articles with the help of the Editorial Secretary who is the main coordinator between different corners, avoiding repetition.
- Collection of the articles required by contacting the targeted authors and inviting them.
- Dividing the articles according to his/her requested plan.
- Revising the articles.
- Reporting directly to the Editorial Secretary.
- Protecting the corner theme and goal.
- Putting forward future plans for upgrading and expansion.
- Prepared to cover other corners when needed.

4. How to apply?

Please send your CV and an application letter (one page) to hq@sicot.org.

We look forward to working with you!





LING HONG LEE (UNITED KINGDOM)

3D Printing in Orthopaedic Surgery

Introduction

The computer engineering technology which brings digital 3D-reconstructed images into a physical form has benefited various medical specialties. Printed models give tactile feedback which sees their initial application in medical education. It is now widely used in the field of clinical medicine, including all subspecialties of Orthopaedic surgery. This article intends to provide a basic understanding of 3D printing.

3D printing is a form of additive manufacturing. An object which is made using additive manufacturing is built by a gradual, layer by layer process to increase its weight and form i.e. brick by brick in house building. This is in contrast to subtractive manufacturing where the final structure is cut out from a starting block. The common additive manufacturing technologies used to print 3D models in Orthopaedic surgery are material extrusion, stereolithography and powder bed fusion (Table 1) (1,2).

| Process / Printing | Technique | Material examples | Notes |
|--|--|---|---|
| Material extrusion (e.g. Fused deposition modelling, FDM) | Deposition of heated liquid or semiliquid material that is rapidly cooled to form a hardened layer | Polylactic acid Acrylonitrile Butadiene Styrene (ABS) Filaflex Polyether-ether-ketone (PEEK) | Cheapest, Vast choice of printing materials, Most common desktop printer |
| Stereolithography | Liquid resin converted into solid material by laser photo-polymerisation | Biocompatible resin Epoxy- or acrylate-based resin | Higher resolution than material extrusion, Requires after printing preparation, Patient specific surgical guide |
| Powder bed fusion (eg. Selective Laser sintering) | Heat source sinters the indicated regions on a thin layer of powder. Process repeated as the building platform drops to allow formation of another layer | Titanium powder Stainless steel Polyamides | Expensive printer and powder, Industrial scale, Metallic implant, Porous metal bone graft |

Table 1: Basic descriptions of common 3D printing techniques

The most commonly used materials in Orthopaedics are polylactic acid (PLA) as it replicates bone structure (3) and Acrylonitrile Butadiene Styrene (ABS). The cost for these materials are low too. Other materials used include tricalcium phosphate, hydroxyapatite, silica and plastics (4).

A 3D printer requires a Standard Tessellation Language (STL) file to create parameters required to transform the file into a sequence of two-dimensional cross sections (1). This is generated from DICOM format of CT or MRI scans. The images or regions of interest are then selected and extracted via segmentation process before exported to an STL file. The 3D printer then translates the STL file into a code to create the parameters. This process can be done by a skilled operator who understands the anatomy and technology using incorporated or external softwares, some of which are CE marked and supported such as Materialise Mimics and Synopsys Simpleware. Additionally, a Computer Aided Design software is required to design and create a patient specific instrument such as cutting guides.

What can I use 3D printed models for?

| | |
|--------------------------|--|
| Pre surgery | Patient communication Simulation Templating |
| Intra-op | Patient specific instruments (guide, implant, referencing) |
| Post-op / Rehabilitation | Orthosis |
| Education | Teaching, surgical course |

Table 2: Function of 3D model

3D models can be used in various settings (Table 2) but are considered medical devices which are regulated by the Medicines and Healthcare products Regulatory Agency unless used for communication or training only (5). Patient specific guide can facilitate surgical steps and improve accuracy especially in cases requiring multiplanar osteotomy (Fig 1). Wong et al evaluated the effectiveness of 3D printing by reviewing published randomised trials. They reported that the use of 3D models either before or during Orthopaedic surgery decreased the operating time, blood loss and fluoroscopy time. It also led to less postoperative pain, more accurate pedicle screw placement and better functional scores for surgeries in spine and lower limb. There was however no difference in complication rates (6).

The obvious disadvantages of 3D printed models are the additional costs, time and skills required in manufacturing. Application of a patient specific instrument can sometimes necessitate wider exposure of soft tissue. In the skeletally immature patients, thickness of periosteum may be underestimated in CT scans. In certain cases such as proximal femur osteotomy, the guide can be too bulky and therefore interfere with placement of guidewire for the proximal femur plate.

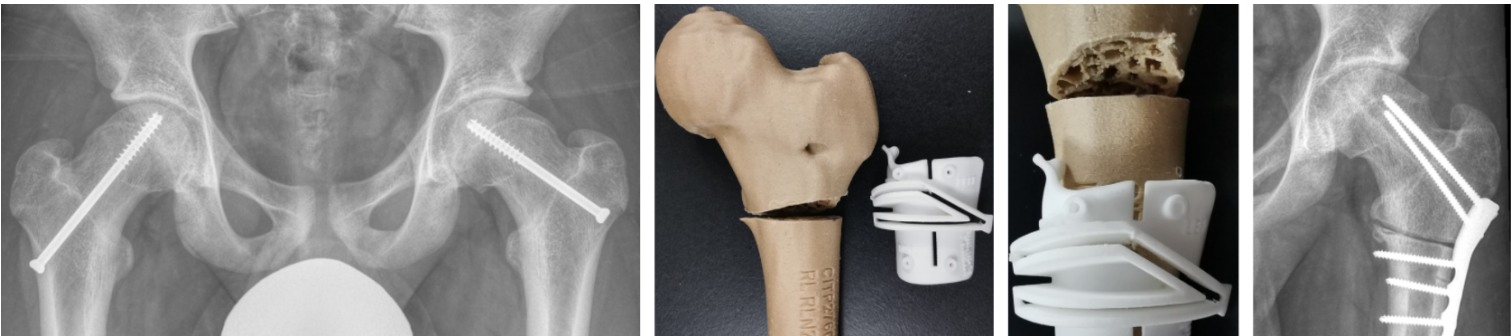


Fig.1: Patient specific guide for Southwick osteotomy. (Left to right) AP pelvis after bilateral pinning insitu following slipped upper femoral epiphysis; frontal view of osteotomised bone model with lateral view of cutting guide; lateral view; and post osteotomy.

Should I get a 3D printer for my department?

There is an increasing number of commercial medical 3D printer companies providing bespoke services. Enthusiastic surgeons may want to start 3D printing their own models but the skills and costs which include a suite of software packages in addition to hardware and materials required to produce and maintain a good quality 3D printing service should not be overlooked. It is tempting to purchase a 3D printer for the office without appreciating the logistics, regulation, quality control implications and health hazards involved. If there is a strong interest in setting a “point of care manufacturing” service, it is advisable to run it in collaboration with medical engineers either in-house or with a professional company. In some countries, closer working relationships with universities is common practice and should be guided by published recommendations (5,7,8).

Future

There is definitely a role for 3D models in improving surgical efficiency and outcome. The challenge is in refining the indication to apply it to appropriate cases. Work is also ongoing to create a 3D transplantable organ. There is tremendous potential in its application in medical education and training. The author would like to see the success of combining augmented reality with multi-material 3D models as training tools for healthcare providers.

Acknowledgement

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MOHAMED SUKEIK (SAUDI ARABIA)

SICOT Newsletter Editorial Board Member

Knowledge Exercises – Multiple Choice Questions: Fungal Periprosthetic Joint Infection

Questions

Fungal periprosthetic joint infection (PJI) is of great clinical relevance as diagnosis and treatment are highly challenging. Previous analyses focused on the treatment rather than the role of the causative fungal agent on clinical outcome. The largest study of its kind to evaluate *Candida* strain – dependent differences in patients with fungal PJI has recently been published. If you believe you are up to date or need to further explore the subject, challenge yourself with the following questions!

1. What is the reported rate of PJIs due to fungal microorganisms after THR and TKR surgery?

- a) <5%
- b) 5-10%
- c) 11-15%
- d) 16-20%
- e) >20%

2. In which of the following *Candida* PJIs patients are typically 70 years of age or older?

- a) *Candida albicans*
- b) *Candida freyschussii*
- c) *Candida glabrata*
- d) *Candida tropicalis*
- e) *Candida parapsilosis*

3. In which of the following *Candida* PJIs the hip joint is more commonly affected?

- a) *Candida albicans*
- b) *Candida freyschussii*
- c) *Candida glabrata*
- d) *Candida tropicalis*
- e) *Candida parapsilosis*

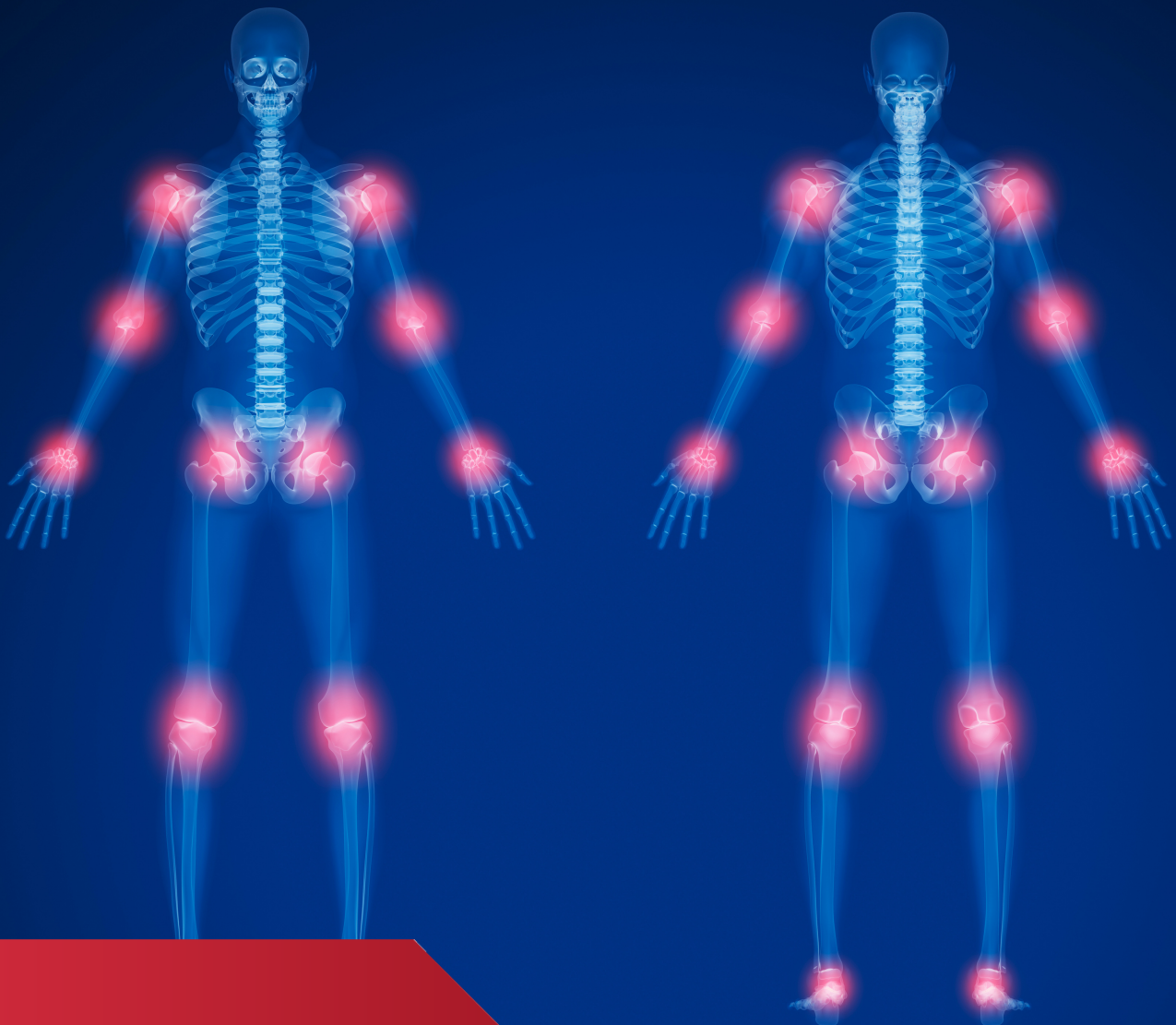
4. In which of the following Candida PJIs infection-free survival is lowest?

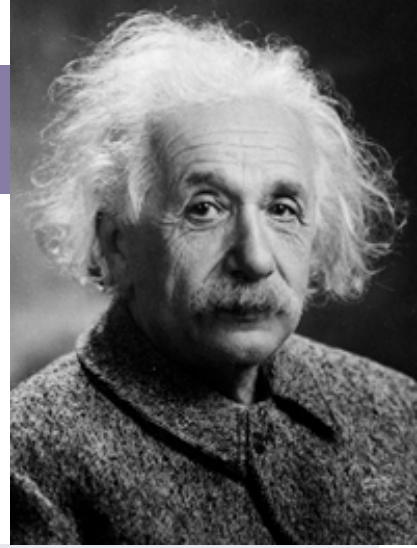
- a) *Candida albicans*
- b) *Candida freyschussii*
- c) *Candida glabrata*
- d) *Candida tropicalis*
- e) *Candida parapsilosis*

5. Recurrent PJI rates are highest in which of the following Candida PJIs?

- a) *Candida albicans*
- b) *Candida freyschussii*
- c) *Candida glabrata*
- d) *Candida tropicalis*
- e) *Candida parapsilosis*

Answers can be found on page 29.





Ten Quotes by Albert Einstein

"Ego=1/Knowledge - More the knowledge lesser the ego, lesser the knowledge more the ego"

"The only thing more dangerous than ignorance is arrogance"

"Wisdom is not the product of schooling but the lifelong attempt to acquire it"

"If you want to live a happy life, tie it to a goal, not to people or objects"

"Weak people revenge, strong people forgive, intelligent people ignore"

"Once we accept our limits, we go beyond them"

"Any fool can know. The point is to understand"

"Where there is a will, there is a way"

"In the middle of difficulty, lies opportunity"

"The measure of intelligence is the ability to change"

Knowledge Exercises – Multiple Choice Questions: Fungal Periprosthetic Joint Infection

Answers

1. a)

While the vast majority of PJI cases are made up by bacterial infections, in approximately 1% of all cases, PJI is due to fungal microorganisms.

2. a)

Patients in the *Candida albicans* group were significantly older (+11.72 years; $p=0.012$) compared to the non-*albicans* *Candida* patients and were typically older than 70 years of age.

3. a)

Candida albicans PJI affected the hip joint significantly more often, while in the non-*albicans* *Candida* group, the knee joint was most affected.

4. a)

At last follow-up, infection-free survival was at 26.79% in *Candida albicans* versus 72% in non-*albicans* PJI ($p=0.046$).

5. a)

Recurrent PJI occurred in a total of eight patients after an average time of 10.37 months (range, 0.17 to 32.63 months): Recurrent PJI occurred in 35.29% of the patients in the *Candida albicans* and in 16.67% of the patients in the non-*albicans* *Candida* PJI group.

Reference:

Karczewski, D., Ren, Y., Andronic, O. et al. *Candida* periprosthetic joint infections — risk factors and outcome between *albicans* and non-*albicans* strains. *International Orthopaedics (SICOT)* 46, 449–456 (2022). <https://doi.org/10.1007/s00264-021-05214-y>

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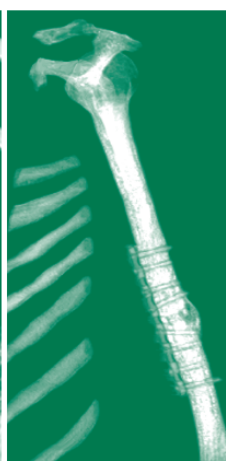
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