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Opinion Open Access

O3DC: What We Can Do, What We Cannot Do and What We Need

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Abstract

Today with the challenges in orthopaedics, we need to create a bridge between orthopaedists and many scientists in many fields to produce a new strategy of education using 3D simulation. In this article, we will explain the aim of our platform (O3DC), in order to mention the viewpoints of our teamwork.

Keywords: Simulation; O3DC; Training

Abbreviations

O3DC: Orthopaedic 3D collection; CAOS: Computer assisted orthopaedic surgery; CAD: Computer-aided design

Opinion

We have all seen that it is a colossal problem to define and categorize the risk factors in orthopaedics. Indeed, there are important types of questions that traditional orthopaedics will never answer. Currently, there are no objective platforms that provide standard information about the simulation methods available for training around the world. To make best use of the platform's strategy, orthopaedists need to know what kinds of clinical problems must be solved and the resources needed in order to perform a good surgery. Likewise, a large scale transition strategy must be developed in order to apply the advanced achievements in the technology framework and the pilot projects to benefit research. For that purpose, we suggest O3DC [1-5] as a solution to understanding the ability to use surgical simulators. It is an innovative idea which bridges the gap between fundamental research and clinical research. Additionally, to serve the clinicians, the following 3 points for the 3D simulation method must be developed:

- Provide an overview of the temperature during drilling for all the bones while taking into consideration the age and sex of the patient.
- Reclassify the fractures using 3D medical images, since the traditional system of classification is not enough in terms of precision.
- Simulate the micro-drilling of the bones which could be an area that contributes significantly to improve the processes of orthopaedic fracture treatments.

Our idea is an attempt to look at the various problems orthopaedists face in order to help them become more effective leaders and safer surgeons (Mohamed Mediouni).

The future of orthopaedic surgery lies between biology and technology. While the biological model focuses on bone regeneration and stem cell research, (CAOS) has been implemented for the past two decades since it embraces all patients' assessments, image processing, pre-operative planning and simulation, operative execution either passive in form of guidance or active by means of robotic surgery and finally post-operative evaluation. This led to the modern Hybrid surgical suites that integrate many parts of these technologies, and also to the surgical simulators designed for training and educational purposes from the unexperienced orthopaedic trainee to the expert surgeon planning for a major tumor resection surgery or complex acetabular fracture reconstruction. A step forward towards the perfect simulation project is a complex integrated system that combines good comprehensive biology, histology, biomechanics, finite element modelling, a 3D data base and CADs of all surgical tools and computer assisted surgical execution templates. This is referred to as the orthopaedic 3D data collection (O3DC). This multidisciplinary project necessitates the collaboration between scientists in Orthopaedic surgery, biologists, mathematicians, engineers, computer and translational scientists in coordination and a transparent in organized structural way (Amal khoury).

Many orthopaedic problems require 3D solutions, and O3DC offers just that. If we want to know more about bone anatomy, fracture mechanics or plan a fracture fixation, O3DC provides us with the relevant tools to model the orthopaedic problems and also to plan the management strategy. Furthermore, this is of great help to training surgeons to allow them to better visualise the parameters of certain cases and plan with their consultant the best method of treatment. Any error can be rectified pre-operatively, which should save time and effort during the intra-operative period (Manit Arora).

Competing Interests

The authors declare that they have no competing interests.

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