Big data applications in orthopaedics

Sir,

Big data is a term used for humongous and heterogeneous or complex unsorted data, from which useful information may be extracted and analyzed using different nontraditional data processing software. This technology has been used for capturing, storing, analysis, crunching, mining, sharing, transfer, and visualization of data. Its applications are applied for predictive analysis in the medical and its associated fields, like Orthopaedics, where the big data are applied to provide personalized treatment. Big data can store data in large volume in different forms (such as images, text, audio, and video), and rapidly generate data to meet the demand and the quality of data. It is used to reduce risk, waste, and automatically report patient data.[1]

In orthopaedics, big data have gained importance in the past two decades. It has helped to create various musculoskeletal registries related to spine surgery, ligament reconstruction, total joint replacement, trauma, and other orthopaedics procedures.[2] It is now becoming popular due to its superiority on the better prediction of a surgery. The main benefits of big data in orthopaedics are better research trails, reduced variability, and helps surgeons to understand patient conditions.

This technological revolution collects the data electronically from previous orthopaedics operations, medical reports, available literature, and even images. This technology has great potential to support the clinical decision, surveillance of disease, and proper management of health.[3] It can be managed by different combinations of software, hardware, which is helpful for laboratory, medical imaging, electronic patient record-keeping, research and development, and information systems.

The big data field is growing, and in the field of orthopaedics, it has extensive applications. It is applied for a deeper understanding of the outcome of procedures, patient-related treatment, and for an early detection of a disease. Table 1 elaborates the contemporary beneficial applications of big data in orthopaedics.

Big data are useful for the prevention and control of disease to better health management.[4]

The main limitation of this technology is the requirement of specific skills and training, which increases the cost. In orthopaedics, accurate data are required to solve

Table 1: Big data applications in orthopaedics

Applications	Description
Treatment	Diagnosis and treatment of the patients
	Helpful in improving clinical trials for new material, tools, implants
	Better follow-up and patient's recordkeeping
Better health	Helps analyzing and tracking diseases, public health, and development
	Predicts adverse event and allows safety monitoring
Prediction of disease	Predict the risk of disease to provide more efficient care and outcomes
	Information management for the proper utilization of resources
Informed decision	Collects requisite information to make informed decision thereby reducing risk during complex surgery
	Improves monitoring of blood pressure, glucose level, and other medical parameters
Patient service	Improves patient service with improved decision-making
	Improves recovery of fractures and other trauma by providing accurate information even about implant efficacy
Extract data of fractured bones	Extract data of fractures and associated trauma for making a better and accurate decision even for related issues

different challenges and issues. Software and hardware cost is another issue to store data.

In the future, big data will be used to detect bone and joint infections and other body parts. By analyzing a given record, it can suggest a better clinical decision support system for the selection of medical tools and appropriately needed devices. Thus, this technology is becoming popular to generate biomedical data and helps provide personalized medicine, patient health, identifying diseases, and better outcomes.

Conflicts of interest
There are no conflicts of interest.

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