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Different approaches to bone transplantation surgery

Abstract

Bone surgery, especially bone transplantation needs to improve in surgical skills, procedures and technology. System and technology is broadening and relatively realistic. Many past challenges and obstacles have been overcomed and knowledgeable than ever before. There is a gradual improvement for bone surgery and replacement in the clinic. Facing with difficult issue of these skills and technology, moderate technical advances and application in the clinic should be improved. This editorial highlights some of the new trends in this area.

Keywords: Bone surgery, artificial bones, orthopedics, 3-D printer, bone replacement.

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Introduction

Human bone is a vulnerable tissues facing with outside pressure, attack and tumor growth and metastasis. Bone fracture and consistent pain are often met in most people.[1–6] In serious patients, there might be no integrity and normal physiological function of damaged bones in some people.[7–13] In certain amount of patients, patients need to be replaced with artificial bones. Many different skills and technologies are associated with these treatment options. This editorial highlights some of new trends in this area- including efforts and improvements of surgical skills, procedure methods, techniques and transplantation materials.

Surgical skills and methods

Many other bone materials and technologies have been attempted in the clinic.[14–18] New therapeutic ideology and technical capability are proposed to improve bone disease treatment. Technical or computation-driven new surgical skills, like bone tissue printing, robot-aid surgery are the future trends. More recently, new biomedical problems are emerged in bone surgery. In this Article, we discuss issues of bone-replace surgery skills, advances for tissue replaces in new bone-like materials and other related techniques. These related issues from idea generation to possible ways of surgical realistic are shown in Figure 1. The key issues in these different parts of surgery improvement and successful rates is to increase the capability of materials to endure human immune systems to less reject to new plants. These processes are included in bone material optimization in different patients, potential drugs to reduce human rejection and small wound of surgery processes in patients. (Figure 1)

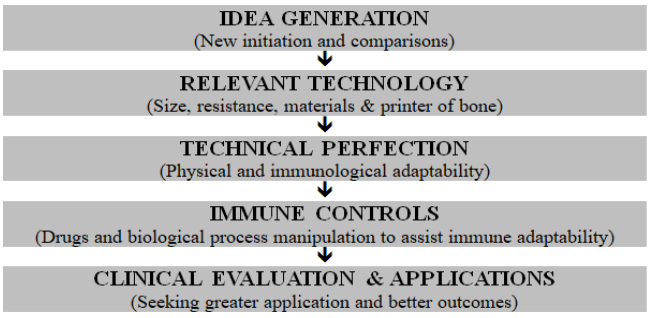

Figure 1 Knowledge and technical progress.

Transplant material optimization

Bone surgery varies greatly in protocol, materials and techniques. Despite of bright future for bone replaced surgery, there is a long way to go in practical utility. In search for new solutions for bone surgery, cutting-edge technology utility, especially immune and cost-effective consideration for "new bones"is the main choice and future priority.[14–16] Figure 2 shows the evolution and optimization of planted materials to human beings from past to future. (Figure 2) Some present unknown materials might be invented for saving life of a lot of needed patients.

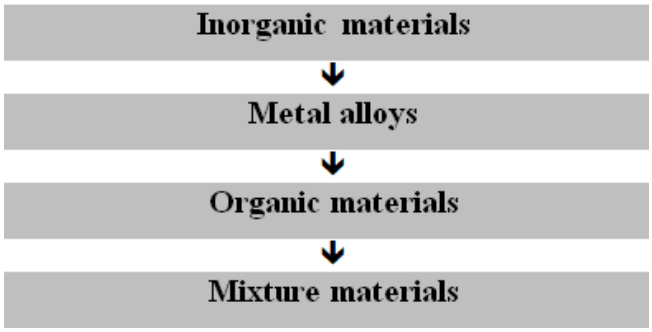

Figure 2 Possible material innovation.

Technical consideration

Bone surgery has a lot of different options. Novelty will be sought from different medical approaches. Excellence tissue and functional repairs will be future trends. Two different approaches for bone replacement are introduced and open to discuss. These key issues should be improved step by step. Emphasis should be drawn. Bone replacement surgery is a complex system. There are two different approaches for scientific, technical and biomedical studies. This include:

a) Surgery skill promotion: It contains biophysics study of bone sizes, pressure endurance and structures.[17,18] Robotic assistance can save the surgical times and small wounds in surgical processes.

b) Printers for different types of bones: It contains information of different materials and molecules of bone against immune-response and manufacture feasibility. Some drugs that can reduce the rejection reactions would be developed to suit different types of patients in the clinic.

Conclusion

In summary, bone surgery study and application will enter into a new era. In order to do so, integration and specification are key issues.

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None.

Conflicts of interest

The authors declare that there are no conflicts of interest.

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