Autologous bone graft is considered as the gold standard in bone reconstructive surgery. However, the quantity of bone available is limited and the harvesting procedure requires a second surgical site resulting in severe complications. Due to these limits, scientists and clinicians have considered alternatives to autologous bone graft. Calcium phosphates (CaPs) biomaterials including biphasic calcium phosphate (BCP) ceramics have proven efficacy in numerous clinical indications.

Thirty percent, 50%, and 70% porous ceramics performed equal to or better than autogenous bone after 3 and 6 months. There may be promise for the use of 50/50 hydroxyapatite/beta-tricalcium phosphate in spine surgery as the need to harvest autograft from the iliac crest is obviated, and complications and cost associated with the harvest are avoided [1)].

Their specific physico-chemical properties (HA/TCP ratio, dual porosity and subsequent interconnected architecture) control (regulate/condition) the progressive resorption and the bone substitution process. By describing the most significant biological responses reported in the last 30years, we review the main events that made their clinical success. We also discuss about their exciting future applications as osteoconductive scaffold for delivering various bioactive molecules or bone cells in bone tissue engineering and regenerative medicine. STATEMENT OF SIGNIFICANCE: Nowadays, BCPs are definitely considered as the gold standard of bone substitutes in bone reconstructive surgery. Among the numerous clinical studies in literature demonstrating the performance of BCP, Passuti et al. and Randsford et al. studies largely contributed to the emergence of the BCPs. It could be interesting to come back to the main events that made their success and could explain their large adhesion from scientists to clinicians. This paper aims to review the most significant biological responses reported in the last 30years, of these BCP-based materials. We also discuss about their exciting future applications as osteoconductive scaffold for delivering various bioactive molecules or bone cells in bone tissue engineering and regenerative medicine [2)].

1)
Toth JM, An HS, Lim TH, Ran Y, Weiss NG, Lundberg WR, Xu RM, Lynch KL. Evaluation of porous biphasic calcium phosphate ceramics for anterior cervical interbody fusion in a caprine model. Spine (Phila Pa 1976). 1995 Oct 15;20(20):2203-10. PubMed PMID: 8545713.
2)
Bouler JM, Pilet P, Gauthier O, Verron E. Biphasic calcium phosphate ceramics for bone reconstruction: A review of biological response. Acta Biomater. 2017 Apr 15;53:1-12. doi: 10.1016/j.actbio.2017.01.076. Epub 2017 Jan 31. Review. PubMed PMID: 28159720.

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