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Journal of Osteoporosis and Physical Activity

Perspective

Replacement of Bone Tissue by Using Ossification Process

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DESCRIPTION

Osteogenesis and ossification are frequently used interchangeably to refer to the process of forming bones. In the first few weeks following conception, the skeleton begins to take shape in parts. The skeletal pattern is formed in the cartilage and connective tissue membranes by the end of the eighth week. Adults continue to build their bones. Even after reaching adult height, bone formation continues for fracture repair and remodeling to accommodate changing lifestyles. Three different cell types-osteoblasts, osteocytes, and osteoclasts-are involved in the formation, expansion, and remodeling of bones.

Types of ossification

Intramembranous: The process of intramembranous ossification involves the replacement of bone tissue by membranes made of sheets of connective tissue [1-4]. These types of bones are known as intramembranous bones. Some of the uneven bones and some of the skull's flat bones are among them. First, connective tissue membranes develop into the eventual bones. When osteoblasts reach the membranes, they place bone matrix all around them. Osteocytes are what are left over after the osteoblasts are encased in matrix.

Endochondral ossification: During endochondral ossification, hyaline cartilage is replaced with bone tissue. In this way, the majority of the bones in the skeleton are created [5-7]. Osteoclasts demolish the freshly created bone to create the medullary cavity after spongy bone has developed in the diaphysis. The epiphyses' cartilage keeps expanding, lengthening the developing bone. Secondary ossification centres later develop in the epiphyses, usually after birth. In contrast to the diaphyses, the spongy bone in the epiphyses is maintained during ossification rather than being broken down to create a medullary cavity [8]. The hyaline cartilage is completely replaced by bone when secondary ossification is finished, with the exception of two locations. Hyaline cartilage still covers the epiphysis' surface as the articular cartilage, and there is still cartilage between the epiphysis and the diaphysis [9]. The process by which the embryonic cartilaginous model of the majority of bones contributes to longitudinal growth and is gradually replaced by bone is known as endochondral ossification. Following the invasion of the chondrocyte columns by metaphyseal blood vessels, bone develops on the remaining columns of calcified cartilage. The main spongiosa, a mixture of calcified cartilage and immature bone, is eventually modified to give rise to the mature bone of the metaphysis. The flat bones of the skull, clavicle, and the majority of the cranial bones are formed by intramembranous ossification, which transforms mesenchymal tissue directly into bone.

Bone growth: At the epiphyseal plate, bones lengthen through a process resembling endochondral ossification. Mitosis is still being used to build the cartilage in the area of the epiphyseal plate close to the epiphysis. In the area close to the diaphysis, the chondrocytes deteriorate over time [10]. To create bone, osteoblasts invade and ossify the matrix. Until the cartilage formation slows and eventually ceases, this process lasts throughout childhood and adolescence [11,12]. The epiphyseal plate entirely ossifies such that just a narrow epiphyseal line is left after cartilage growth stops, which typically occurs in the early twenties.

CONCLUSION

Generation of a bone-targeting platform by linking drugs to a BP residue has been an appealing concept for many years. Other Osteogenesis Imperfecta (OI) types are manageable. Babies born with mild types of OI can live healthy lives into adulthood. Osteogenesis imperfecta treatment focuses on increasing bone strength and improving quality of life.

REFERENCES

1. Hoshino Y, Hidaka N, Kato H, Koga M, Taniguchi Y, et.al. Incidence of ossification of the spinal ligaments in acromegaly patients. Bone Rep. 2022;17:101628.
2. He X, Li Y, Miao H, Xu J, Ong MT. High formability Mg-Zn-Gd wire facilitates ACL reconstruction via its swift degradation to accelerate intra-tunnel endochondral ossification. J Magnes. Alloy. 2022;12:17-24.
3. Nguyen V, Buka RL, Roberts B, Jones M, Friedlander SF. Koilonychia, dome-shaped epiphyses, and vertebral platyspondylia. J Pediat. 2005;147(1):112-114.

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Received: 23-Dec-2023, Manuscript No. JOPA-23-22265; **Editor assigned:** 25-Dec-2023, PreQC No. JOPA-23-22265 (PQ); **Reviewed:** 08-Jan-2023, JOPA-23-22265; **Revised:** 15-Jan-2023, Manuscript No. JOPA-23-22265 (R); **Published:** 22-Jan-2023, DOI:10.35841/2329-9509.23.11.333

Citation: Rai A (2023) Replacement of Bone Tissue by Using Ossification Process. J Osteopor Phys Act.11:333.

4. Heinonen J, Zhang FP, Surmann-Schmitt C, Honkala S, Stock M, Poutanen M, et.al. Defects in chondrocyte maturation and secondary ossification in mouse knee joint epiphyses due to Snorc deficiency. Osteoarthritis Cartilage. 2017;25(7):1132-1142.
5. Moreno-Andres D, Holl K, Antonin W. The second half of mitosis and its implications in cancer biology. Semin Cancer Biol. 2022;11:1-17. Academic Press.
6. Tu T, Zehnder B, Wettengel JM, Zhang H, Coulter S, Ho V, et al. Mitosis of hepatitis B virus-infected cells in vitro results in uninfected daughter cells. JHEP Rep. 2022;4(9):100514.
7. Spielmann L, Duret PM, Widawski L, Rinagel M, Messer L, Manoila I. Diffuse idiopathic skeletal hyperostosis associated ossification of the posterior longitudinal ligament. Joint Bone Spine. 2022 ;89(6):105429.
8. Barry F, Schlund M, Raoul G, Myon L, Ferri J, Nicot R. Classification of pedicle ossification after maxillofacial reconstruction with bony free flap: An observational study. J Stomatol Oral Maxillofac Surg. 2022;123(2):228-232.
9. Maehara N, Morioka T, Shimogawa T, Suzuki SO, Mizoguchi M, Haga S. Massive ossification with hematopoietic marrow on both surfaces of the expanded polytetrafluoroethylene artificial dura mater. World Neurosurgery. 2020;139:405-409.
10. Wood CB, Rohde SL, Sinard RJ, Mannion K, Bigcas JL. Incidence of pedicle ossification in osseous free flap reconstruction in the head and neck. Oral Oncol. 2020;103:104611.
11. Doi T, Ohashi S, Ohtomo N, Tozawa K, Nakarai H, Yoshida Y, et al. Evaluation of bone strength using finite-element analysis in patients with ossification of the posterior longitudinal ligament. Spine J. 2022;22(8):1399-407.
12. Vu P, Faraday R, Vu D, Kim J. Silver nitrate stain masquerading as a heterotopic ossification. Radiol Case Rep. 2020;15(5):450-453.