Outcomes of Bone formation Induced By Melatonin And three Flavonoids (Apigenin, Genistein and naringenin): a systematic review

Jennifer Herrera Pelàez (1), Jorge Eduardo Delgado(2), Eduard Ferrés Amat(1),
Carlos Pérez-Albacete Martínez(2), Jose Luis Calvo Guirado(3)

- (1) Student of master of implantology periodontics bone and tissue regeneration and implant prostheses
(2) Extraordinary professor of postgraduate programs in oral surgery and implantology UCAM. Universidad Católica San Antonio de Murcia. Murcia Spain.
(3) Director of the international chair of research in dentistry. UCAM Universidad Católica San Antonio de Murcia. Murcia Spain

Background

There are oral pathologies that cause a significant loss of bone support that can cause a functional and aesthetic limitation to the patient. In the literature we can find a large number of biomaterials used in bone regeneration techniques such as autografts, with osteogenic capacity; allografts and xenografts. In this sense, the use of hormones such as melatonin and substances of natural origin such as flavonoids, have bone-stimulating effects that may be promising in terms of bone neoformation of bone defects.

AIM

The aim of this review was to evaluate and compare the outcomes of the effect of topical applications of melatonin and 3 Flavonoids; apigenin (4',5,7-trihydroxyflavone), genistein (4',5,7-Trihydroxyisoflavone), naringenin (4',5,7-Trihydroxyflavanone) on new bone formation.

Methods and Materials

PubMed, Science Direct, EBSCO and the Cochrane base databases were used to identify articles published between 2008 and 2016 on melatonin and flavonoids (Apeginin, Genistein and Naringenin) effects on bone. twenty- five articles were selected consisting of 21 animal or human research studies and 4 review articles. Exclusion criteria were; articles published before 2008 and language other than English.

References

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Results

The majority of the studies included showed a statistically significant positive effect of melatonin on bone formation, that melatonin acts at the level of the osteoclast lacuna due to its antioxidant properties and its ability to neutralize reactive species, thereby inhibiting bone resorption. Furthermore, a range of studies have shown that apigenin acts on bone, diminishing osteoclastogenesis and osteoclastic function and at the same time increasing osteoblast, genistein is known to have an inhibitory effect on tyrosine kinase and to inhibit bone resorption and osteoblastic.

STUDY	YEAR	STUDY DESIGN	OBSERVATION PERIOD	BONE FORMATION
Xue Zhang et all	2015	Experimental study		yes: osteogenesis
Jose L. Calvo-Guirado et all	2010	experimental Study	60 days	yes: osteoblast differentiation
Wengang Wang et all	2014	experimental Study	10 days	yes: protects against Ti-particle-induced osteolysis in vivo
EMINE CANYILMAZ et all	2016	Experimental Study	6 months	yes:melatonin and genistein have clear antioxidant properties
Jos e Luis Calvo-Guirado et all	2016	Experimental Study	90 days	yes: increased both the total amount and quality of neoformed bone in early healing stages
María Piedad Ramírez-Fernández et all Nada Ors'olic et all	2012	Experimental Study	4 semanas	yes: Angiogenesis and Bone cell proliferation
	2013	Experimental Study	14 days	yes: flavonoids antioxidants can reduce the toxic effects of retinoic acid on bone loss
LEI-GUO MING, ¹ KE-MING CHEN, et all	2013	REVIEW ARTICLE		yes: genistein in osteogenesis and anti-osteoclastogenesis
L. G. Ming* et all	2012	Experimental Study	16 days	yes:NG to enhance osteoblast differentiation

Conclusions

Topical applications of either melatonin, apigenin, genistein and naringenin have a potential to accelerate bone tissue, Flavonoids .provide biological regulatory action. Given that their main microvascular effect is on blood cells and endothelial cells

NARINGENIN	Inhibit osteoclast differentiation and function
APIGENIN	inhibited osteoclastogenesis and prevented bone loss in ovariectomized rats in vivo
GENISTEIN	Genistein has stronger antioxidative
MELATONINA	stimulates differentiation in preosteoblast lines