



ACIDO IALURONICO NELLE APPLICAZIONI INTRAORALI Selezione della letteratura

Legenda: HA = Hyaluronic Acid

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REVISIONE DELLA LETTERATURA

Hyaluronic acid: Perspectives in dentistry. A systematic review. Casale M. ET AL. Int J Immunopathol Pharmacol. 2016 Jun 8. pii: 0394632016652906. [Epub ahead of print]

At the end of our study selection process, 25 relevant publications were included, three of them regarding gingivitis, 13 of them relating to chronic periodontitis, seven of them relating to dental surgery, including implant and sinus lift procedures, and the remaining three articles describing oral ulcers.

➔ Not only does topical administration of HA play a pivotal key role in the postoperative care of patients undergoing dental procedures, but positive results were also generally observed in all patients with chronic inflammatory gingival and periodontal disease and in patients with oral ulcers.

Tradotto dalla discussione:

".....i dati che sono emersi dalla nostra indagine della letteratura, ci consentono di suggerire che lo ialuronato può giocare un ruolo potenziale importante nella guarigione dei tessuti parodontali e come aiuto al trattamento della malattia parodontale.

L'acido ialuronico promuove una remissione dei sintomi non solo nella gengiva marginale ma anche nei tessuti parodontali profondi attraverso il conosciuto meccanismo stabilito per l'acido ialuronico nella guarigione della ferita.

HA topico può essere impiegato come trattamento coadiuvante nelle gengiviti, parodontiti croniche, come pure durante il periodo postoperatorio per le procedure implantari e di rialzo del seno per una più rapida guarigione e per ridurre il discomfort del paziente durante il periodo postoperatorio. Infine, HA può essere un utile trattamento per le ulcere orali.

Vorremmo enfatizzare che i trattamenti topici sono più efficaci nella loro capacità di rilasciare alte concentrazioni di agenti farmacologici ai denti e alle mucose orali rispetto alla loro somministrazione sistemica.

Inoltre ricerca di laboratorio e controlli clinici randomizzati su vasta scala implicano che HA può essere un valido carrier delle cellule del tessuto parodontale promuovendo la rigenerazione tissutale negli amenti di tessuto parodontale sia mineralizzato che non mineralizzato".

STUDI IN VITRO

Pirnazar, Pilloni et al. Bacteriostatic effect of hyaluronic acid In J Perio, April 1999

Conclusions: The results of this study suggest that HA in the MW range 1300 kDa may prove beneficial in minimizing in bacterial contamination of surgical wounds when used in guided tissue regeneration.

- hyaDENT BG is in this range
- hyaDENT BG può proteggere il sito dopo trattamento di chirurgia parodontale
- hyaDENT BG può proteggere il materiale di sostituto osseo da una possibile contaminazione

Muller Andrea et al. Effect of hyaluronic acid on morphological changes to dentin surfaces and subsequent effect on periodontal ligament cell survival, attachment, and spreading, Clin Oral Invest DOI 10.1007/s00784-016-1856-6, Published on line May 2016

Interestingly, non-cross-linked HA significantly increased cell numbers at 8 h, whereas cross-linked HA improved cell spreading as qualitatively assessed by SEM.

Conclusions The results from the present study demonstrate that both carrier systems for HA were extremely biocompatible and demonstrated either improved cell numbers or cell spreading onto dentin discs.

Clinical relevance HA is a highly biocompatible material that may improve PDL cell attachment or spreading on dentin.

- hyaDENT BG does allows the spreading of PDL (periodontal ligament) cells which are important for a perio regeneration whereas hyaDENT non-crosslinked is helpful in the short term.

STUDI CLINICI PARODONTALI

Pilloni et al, Effect of hyaluronan on calcification-nodule formation from human periodontal ligament cell culture Journal of Applied Biomaterials & Biomechanics 2003

Discussion: . From our finding it can be hypothesized that the presence of a high molecular weight HA in the PDL as it is in vivo prevents cells from calcifying and eventually form either bone or cementum. It is postulated that for the same reason the root surface is inhibited from ankylosing with bone. Finally, there is increasing evidence of HA as both a storehouse and a vehicle for growth factors to generate direct and specific cellular effects.

- la presenza di acido ialuronico HMW (come il hyaDENT & hyaDENT BG) può aiutare una rigenerazione ossea ed del cemento radicolare.

Jentzch H et al. Treatment of gingivitis with hyaluronan. J Clin Periodontol 2003;30: 159-164

Conclusions: these data suggest that a hyaluronian containing gel has a beneficial effect in the treatment of plaque-induced gingivitis.

Sukumar S., Ivo Dřízhal I. 'Hyaluroinic acid and periodontitis' ACTA MEDICA 2007;50(4):225-228

Conclusions: The use of HA in the treatment of inflammatory process is established in medical areas such as orthopedics, dermatology and ophthalmology. In the field of dentistry, it has shown anti-inflammatory and anti-bacterial effects in gingivitis and periodontitis therapy. Due to its tissue healing properties, it could be used as an adjunct to mechanical therapy in the treatment of periodontitis.

- HA viene già utilizzato in altre discipline mediche ed è ben documentato
- HA può portare dei vantaggi per i trattamenti parodontali.

Johannsen A. et al. Local Delivery of Hyaluronan as an Adjunct to Scaling and Root Planing in the Treatment of Chronic Periodontitis J Periodontol 2009



Conclusions: Conclusion: The local application of hyaluronan gel in conjunction with scaling and root planing may have a beneficial effect on periodontal health in patients with chronic periodontitis
→ hyaDENT può migliorare il risultato clinic quando usato dopo levigatura.

Fawzi et al Local application of hyaluronan gel in conjunction with periodontal surgery: a randomized controlled trial in Clin Oral Inv, 2012

Conclusions: Hyaluronan gel application in conjunction with periodontal surgery appears to result in significant improvement of CAL (clinical attachment level) and in reduction of GR (gingival recession). Hyaluronan gel application appears to improve the clinical outcome of MWF (modified Widman flap) surgery.

→ il gel applicato nello studio é di una concentrazione di 0.8%, il nostro è di 1,6%. Con il hyaDENT BG si possono così raggiungere ancora dei risultato migliori

→ hyaDENT BG può migliorare il risultato clinico dopo trattamento parodontologico

Bevilacqua et al. Effectiveness of adjunctive subgingival administration of amino acids and sodium hyaluronate gel on clinical and immunological parameters in the treatment of chronic periodontitis in Annali di Stomatologia, 2012

Conclusions: The use of HA in the treatment of inflammatory process is established in medical areas such as orthopedics, dermatology and ophthalmology. In the field of dentistry, it has shown anti-inflammatory and anti-bacterial effects in gingivitis and periodontitis therapy. Due to its tissue healing properties, it could be used as an adjunct to mechanical therapy in the treatment of periodontitis.

→ hyaDENT può essere di aiuto dopo un trattamento non chirurgico (levigatura)

STUDI SPERIMENTALI SULL'OSSO

Sasaki, Watanabe Stimulation of Osteoinduction in Bone Wound Healing by High-Molecular Hyaluronic Acid in Bone 1995

Conclusions: Taken together, these data suggest that high-molecular HA functions by effectively retaining osteoinductive growth factors within the local environment by virtue of its physicochemical properties; it is capable of accelerating new bone formation during bone wound healing through stimulation of osteogenic cell differentiation. These results suggest that high-molecular HA is capable of accelerating new bone formation through mesenchymal cell differentiation in bone wounds.

→ Base showing positive effect of HA in Bone regeneration

→ HA aiuta ed accelera la rigenerazione ossea

Muzzaffer et al, The Effect of Hyaluronic Acid-supplemented Bone Graft in Bone Healing: Experimental Study in Rabbits JOURNAL OF BIOMATERIALS APPLICATIONS, 2006

Conclusions: Statistical analyses showed that there is no difference between the experimental group and the control group on the 20th day. The scores for group of HA-supplemented bone graft were significantly higher than those for group of control on the 30th and 40th days of the study ($p < 0.0001$). In conclusion, the cavities that have been filled with HA and bone graft (in this case Tutoplast Spongioza, Bovine-Microchips) have shown higher scores than the control group during every period of the study.

→ HA in combinazione con un sostituto osseo accelera la rigenerazione ossea

de Brito Bezerra et al. Association of hyaluronic acid with a collagen scaffold may improve bone healing in critical-size bone defects In Clin. Oral Impl. Res. 2012.

The association 1% HA gel/Acellular collagen sponge (ACS) (0.96 +/- 0.14mm) had significantly greater bone fill than the control (0.5 [1] 0.02mm) and ACS (0.56 [1] 0.05mm)-treated groups ($P < 0.0043$ and 0.0173, respectively). Treatment with a 1% HA gel (0.7 +/- 0.14mm) showed no significant differences when compared with the other treatments. Conclusion: Within the limits of this study, a 1% HA gel associated



with a collagen scaffold can improve new bone formation in critical-size defects. However, this treatment never resulted in complete closure of the defects and healing in the major portion of the defects was characterized by fibrous tissue.

- HA con spugna di collagene migliora la guarigione di grandi difetti ossei
- già solo il HA da solo migliora il risultato in comparazione di una spugna di collagene da sola.

STUDI CLINICI SULL'OSSO

Schwartz et al. Clinical evaluation of demineralized bone allograft in a hyaluronic acid carrier for sinus lift augmentation in humans: A computed tomography and histomorphometric study CLINICAL ORAL IMPLANTS RESEARCH 2007

Conclusions: The carrier for DBXs (DFDBA with HA) is hyaluronic acid, a biocompatible, biodegradable, and nontoxic natural polymer. DBXs alone or in combination with Bio-Oss was as effective as DFDBA/Bio-Oss, even though the hyaluronic acid carrier reduced the absolute amount of DFDBA to 16%. The clinicians involved in the sinus lift surgeries felt that granules of the other materials could be easily incorporated, but that DBXs (DFDBA with HA) by itself exhibited good handling characteristics and sufficient body to fill the sinus space without sagging. The added dimension of a putty-like consistency for easier handling earmarks

ElKaragy , Alveolar Sockets Preservation Using Hydroxyapatite / Beta tricalcium Phosphate with Hyaluronic Acid J Amer Science 2013

The results demonstrated that all sites examined in this study displayed evidence of new bone formation. A statistically significant difference in the amount of new bone formation were found between sites that healed for an average of 8 only. The results demonstrating approximately 78%, 68 % and 63% of new vital bone formation for groups grafted with HA/BTCP +HY , HA/BTCP and control group respectively after 8 weeks postoperatively. In conclusion these results exhibited that the use of hydroxyapatite / beta tricalcium phosphate with hyaluronic acid appears to be more efficient in osteoconduction when compared with of hydroxyapatite / beta tricalcium phosphate alone and could be promising strategy for preservation of alveolar sockets.

Ghada Bassouni, Journal of American Science 2013;9

Scanning electron microscopy analysis demonstrated that the implants with hyaluronate coating had significantly the least percentage of gap distance at 8 weeks ($P=0.0079$) compared with the uncoated implants. Biofunctionalization of the implant surface with hyaluronate significantly improve bone to implant contact and osseointegration.

- l'utlizzo di hyaDENT potrebbe migliorare la osseointegrazione su superfici implantari

Stiller et al Performance of β -tricalcium phosphate granules and putty, bone grafting materials after bilateral sinus floor augmentation in humans in Biomaterials 2014

Conclusions: Both TCP (beta tricalcium phosphate) materials actively supported bone formation and matrix mineralization 6 months after sinus floor elevation. This resulted in favourable bone regeneration and degradation of the graft material which created a sufficient volume of osseous tissue to facilitate stable dental implant placement. The TCP-P (putty, TCP mixed with HA) material compared to TCP-G (TCP graft, without HA), displayed better surgical handling properties. The HA matrix had no adverse effect on the bone formation, bone tissue maturation or graft volume stability. Histomorphometric and radiologic results of TCP-P (with HA) expressed statistically significant difference to TCP-G, in terms of volume reduction, volume stability and bone formation. Immunohistochemical osteogenic marker expression displayed also a higher tendency for TCP-P. Hence, TCP-P can be regarded as excellent material for sinus floor elevation.

- hyaDENT BG & TCP é una soluzione completamente sintetica con buona rigenerazione ossea
- acido ialuronico aiuta la generazione ossea e riduce la perdita di volume



it as a welcome addition to dento-facial and orthopedic surgery. This study confirmed the hypothesis that new bone formation is dependent on the DFDBA formulation used and demonstrated that DBXs (DFDBA with HA), alone or in combination with other materials, can be used successfully for sinus floor elevation.

STUDI CLINICI SUI TESSUTI MOLLI

Becker W et al Minimally invasive treatment for papillae deficiencies in the esthetic zone: a pilot study. Clinical Implant Dentistry and Related Research, Volume 12, Number 1, 2010

Abstract

BACKGROUND:

The presence of papillary deficiencies adjacent to dental implants or teeth presents an esthetic concern for the dental team and patients.

PURPOSE:

The aim of this pilot project is to evaluate a new method for reducing or eliminating small papillary deficiencies. The use of a commercially available gel was evaluated as a possible method for enhancing deficient papillae.

MATERIALS AND METHODS:

Eleven patients, seven females and four males, with an average age of 55.8 years (ranging from 25 to 75 years) with 14 treated sites are included in this pilot study. Patients had a minimum of one papillary deficiency in the esthetic zone. Prior to treatment photographs were either taken at a 1:1 ratio or converted to a 1:1 ratio using a commercially available program. A standardization photographic device was not used. After administration of a local anesthetic, a 23-gauge needle was used to inject less than 0.2 mL of a commercially available and Food and Drug Administration approved gel of hyaluronic acid 2-3 mm apical to the coronal tip of the involved papillae. Patients were seen every three weeks and treatment was repeated up to three times. Patients were followed from 6 to 25 months after initial gel application. A computer program measured changes in pixels between initial and final treatments. A formula was derived to determine percentage change in the negative space between initial and final examinations.

RESULTS:

Each site was individually evaluated. Three implant sites and one site adjacent to a tooth had 100% improvement between treatment examinations. Seven sites improved from 94 to 97%, three sites improved from 76 to 88%, and one site adjacent to an implant had 57% improvement.

CONCLUSION:

Results from this pilot study are encouraging and present evidence that small papillary deficiencies between implants and teeth can be enhanced by injection of a hyaluronic gel. Improvements were maintained for a range of 6 to 25 months.

→ l'utlizzo di hyaDENT può migliorare la chiusura dei triangoli neri estetici fino a 24 mesi. Alternativamente potrebbe trovare indicazione anche l'impiego di hyaDENT BG.

September 2016

