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**Assessment of Hyaluronic Acid Carrier with Xenogenic Cancellous  
Bone for Maxillary Sinus Augmentation: A Clinical Study**

Thesis Submitted for partial fulfillment of the requirements for  
Doctoral Degree in Oral and Maxillofacial Surgery,  
Faculty of Dentistry, Ain-Shams University

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# بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

﴿عَامَنَ الرَّسُولُ بِمَا أُنْزِلَ إِلَيْهِ مِنْ رَبِّهِ وَالْمُؤْمِنُونَ كُلٌّ ءَامَنَ بِاللَّهِ  
وَمَلَائِكَتِهِ وَكُتُبِهِ وَرُسُلِهِ لَا نُفَرِّقُ بَيْنَ أَحَدٍ مِنْ رُسُلِهِ وَقَالُوا  
سَمِعْنَا وَأَطَعْنَا غُفْرَانَكَ رَبَّنَا وَإِلَيْكَ الْمَصِيرُ ﴿٢٨٥﴾

لَا يُكَلِّفُ اللَّهُ نَفْسًا إِلَّا وُسْعَهَا لَهَا مَا كَسَبَتْ وَعَلَيْهَا مَا  
اَكْتَسَبَتْ رَبَّنَا لَا تَأْخُذْنَا إِنْ نَسِينَا أَوْ أَخْطَأْنَا رَبَّنَا وَلَا تَحْمِلْ  
عَلَيْنَا إِصْرًا كَمَا حَمَلْتَهُ عَلَى الَّذِينَ مِنْ قَبْلِنَا رَبَّنَا وَلَا تُحَمِّلْنَا  
مَا لَا طَاقَةَ لَنَا بِهِ وَاعْفُ عَنَّا وَاعْفِرْ لَنَا وَارْحَمْنَا أَنْتَ مَوْلَانَا  
فَاَنْصُرْنَا عَلَى الْقَوْمِ الْكَافِرِينَ ﴿٢٨٦﴾



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*“For the one who believes in me.....*

*My Mother”*

*“To my backbone and soulmate.....*

*My sister”*

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## **List of Contents**

**Introduction**

**Review of literature**

**Aim of the Study**

**Patients and Methods**

**Results**

**Discussion**

**Summary**

**Conclusion**

**Recommendations**

**References**

**Arabic summary**

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## List Of Abbreviations

<i>Abbreviation</i>	<i>Full name</i>
<b>HA</b>	<i>Hyaluronic acid</i>
<b>GBR</b>	<i>Guided Bone Regeneration</i>
<b>BMP</b>	<i>bone morphogenetic protein</i>
<b>ABB</b>	<i>Anorganic Bovine Bone</i>
<b>FFB</b>	<i>fresh frozen bone</i>
<b>DFDBA</b>	<i>demineralized freeze dried bone allograft</i>
<b>PRF</b>	<i>Platelet rich fibrin</i>
<b>PDGF</b>	<i>platelet-derived growth factor</i>
<b>B-TCP</b>	<i>Beta Tricalcium Phosphate</i>
<b>TCP</b>	<i>Tricalcium Phosphate</i>
<b>GF</b>	<i>Growth Factors</i>
<b>TGF</b>	<i>Transforming Growth Factor</i>
<b>IGF</b>	<i>Insulin like Growth Factor</i>
<b>FGF</b>	<i>Fresh frozen Growth Factor</i>
<b>PRP</b>	<i>platelet rich plasma</i>
<b>rhBMP</b>	<i>recombinant bone morphogenetic protein</i>
<b>MSCs</b>	<i>Mesenchymal Stem Cells</i>
<b>CD44</b>	<i>Cluster of Differentiation 44</i>
<b>MHBA</b>	<i>Mineralized human bone allograft</i>
<b>CT</b>	<i>Connective tissue</i>
<b>CBCT</b>	<i>cone beam computerized tomography</i>
<b>DBM</b>	<i>demineralized bone matrix</i>
<b>Fig</b>	<i>Figure</i>

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<b><i>mm</i></b>	<i>Millimetre</i>
<b><i>Ncm</i></b>	<i>Neuten centimetre</i>
<b><i>MT</i></b>	<i>Messon's Trichrome</i>
<b><i>TRAP</i></b>	<i>Tartrate Resistant Acid Phosphatase</i>
<b><i>REC</i></b>	<i>Research Ethical committee</i>
<b><i>SD</i></b>	<i>Standard deviation</i>
<b><i>CI</i></b>	<i>Confidence Intervals</i>
<b><i>IBM</i></b>	<i>International business machine</i>
<b><i>SPSS</i></b>	<i>Statistical program for social science</i>
<b><i>SFE</i></b>	<i>Sinus floor elevation</i>
<b><i>CHBG</i></b>	<i>Collagenated Heterologous Bone Graft</i>

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## List Of Figures

No	Figure title
Figure 1	patient evaluation chart
Figure 2	Preoperative CBCT of maxilla showing bilateral pneumatized maxillary sinus related to radiopaque objects.
Figure 3	Preoperative CBCT of maxilla showing the measurement of alveolar bone height in relation to the maxillary sinus floor.
Figure 4	CBCT coronal view showing posterior superior alveolar artery lying at the lateral wall of maxillary sinus.
Figure 5	Crestal incision with anterior and posterior releasing incisions.
Figure 6	Reflection of full thickness flap.
Figure 7	Bony window preparation by round diamond bur size 8.
Figure 8	Sinus membrane elevation.
Figure 9	Bony cavity created after membrane elevation.
Figure 10 a, b & c	Photographs showing: a, the sinus cavity was filled with graft material, b, the sinus cavity was closed by collagen membrane and c, suturing. ( <b><i>Control group</i></b> ).
Figure 11 a, b	a, xenograft (anorganic bovine bone). b, collagen type membrane.
Figure 12 a, b & c	Photographs showing: a, the sinus cavity was filled with graft material mixed with HA,(study group)/ b, the hyaluronic acid application over the graft material before closure and c: <i>Suturing and Closure (study group)</i> .
Figure 13 a & b	<b>a:</b> Hyadent BG Bio Science, b:The mixture of xenograft and Hyadent gel.

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Figure 14	CBCT after 6 months of sinus lifting
Figure 15	Preoperative CBCT (gray image) which superimposed by postoperative CBCT (red image).
Figure 16	the trephine bur while harvesting the core biopsy.
Figure 17	Trephine bur containing biopsy.
Figure 18	Dental Implant successfully in place.
Figure 19	A panoramic view showing dental implants installed after successful sinus augmentation.
Figure 20	final fixed prosthesis
Figure 21	Cell Marque Sigma Aldrich Company-USA
Figure 22	Screen shot from Leica Q win and Q go software.
Figure 23	Bar chart representing mean and standard deviation values for bone height before and after augmentation within each group
Figure 24	Bar chart representing mean and standard deviation values for newly formed bone percentages in the two groups.
Figure 25	Bar chart representing mean and standard deviation values for bone marrow percentages in the two groups
Figure 26	Bar chart representing mean and standard deviation values for residual bone percentages in the two groups
Figure 27	Bar chart representing mean and standard deviation values for osteoid tissue percentages in the two groups
Figure 28	Bar chart representing mean and standard deviation values for mature bone percentages in the two groups

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Figure 29	Clinical photographs showing a case with bilateral sinus lifting (right side: control group/ left side: study group). a. preoperative , b.postoperative after loading of successful dental implants bilaterally.
Figure 30	A preoperative reformatted panoramic view showing a case with bilateral sinus pneumatization.
Figure 31	A postoperative reformatted panoramic view showing a case with bilateral sinus augmentation after 6 months.
Figure 32	A panoramic view showing the case after implant placement.
Figure 33	Clinical photographs showing a case with unilateral sinus lifting (right side: study group). a. preoperative , b.postoperative after loading of successful dental implants unilaterally.
Figure 34	A preoperative reformatted panoramic view showing a case with unilateral sinus pneumatization.
Figure 35	A postoperative reformatted panoramic view showing a case with unilateral sinus augmentation after 6 months.
Figure 36	A panoramic view showing the case after implant placement.
Figure 37	Haematoxylin and Eosin (H&E) stained sections of (Group A), showing newly formed bone (NB) with Bone marrow (BM). (Arrow) dense inflammatory reaction.(H&E 200 magnification scale bar:100 mm)
Figure 38	Haematoxylin and Eosin (H&E) stained sections of (Group B), showing newly formed bone (NB), Bone marrow (BM) and residual bone graft(RM). (Arrow) presence of Giant cells indicating the process of remodelling.(H&E 200 magnification, scale bar:100 mm)
Figure 39	Haematoxylin and Eosin (H&E) stained sections of (Group B), showing newly formed bone (NB), Bone marrow (BM) and residual bone graft (RM). (Black arrow) showing lines of remodeling. (Blue arrow) showing blood vessel.(yellow arrow) showing osteocytes. (Red arrow) showing osteoblastic rimming.(H&E 200 magnification, scale bar:100 mm)