## Osteopaste – A Pre-Clinical In Vivo Histological Evaluation: Future Application

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## Introduction

# Spinal fusion: surgery to permanently connect two or more vertebra, eliminating motion between them





Natural	Synthetic
GOLD STANDARD: autograft harvest from iliac crest	<ul> <li>Calcium phosphate</li> <li>Calcium sulphate</li> <li>Hydroxyapatite</li> <li>Tricalcium phosphospate</li> <li>Combinations</li> </ul>
Properties: Osteoinduction, osteoconduction and osteogenesis	Properties : Osteoconduction
Limitations: bleeding, infection, nerve injury, chronic pain, increases cost & time of surgery	Advantages: No risk of disease transmission, unlimited supply



## Osteopaste : injectable selfhardened synthetic bone cement





## Specific Objective

To compare new bone formation *qualitatively* by undecalcified histology between Osteopaste, JectOS and MIIG–X3 at different assessment periods



## Methodology

ANIMAL ETHICAL APPROVAL – IIUM/IACUC Approval/2016/(9)(50)



#### **PREPARATION OF OSTEOPASTE**



Osteopaste in paste form



**Ready for implantation** 



#### **ANIMAL SURGERY**









### Results

6 weeks 12 weeks 24 weeks 10 **OSTEOPASTE** OP Lateral surface OP Medial surface New bone Critical size **Critical size** area bridge defect completely defect the critical Anterior border size defect bridge JECTOS Jectos Jectos Jectos Critical size 🗾 **Critical size** defect defect Critical size 🦯 defect MIIG-X3 СВ Critical size **Critical size defect** Soft tissue stroma defect completely bridge

#### Magnification: 4X

## OSTEOPASTE



M



OB

OP- OsteopasteNB – New boneOB – OsteoblastO – OsteoidM – Marrow cellOriginal magnification, 10x

NB



## **JECTOS**







NB – New bone O – Osteoid **OB – Osteoblast Original magnification, 10x** 





NB – New bone O – Osteoid CS – Chondroblasts HC – Hypertrophic chondrocytes Original magnification, 10x

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## Histological findings

- Osteopaste group
   CSD bridged at 12 weeks
- 2. JetOs group CSD wasn't bridged at all assessment periods
- 3. MIIG –X3 group CSD bridged at 12 weeks























Autograft + Bone substitute















## Conclusion

Osteopaste has great potential as a bone substitute in a spinal fusion surgery



## Thank you

