

# Outcomes of Osseodensification Drills for Implant placement in a Residency Program

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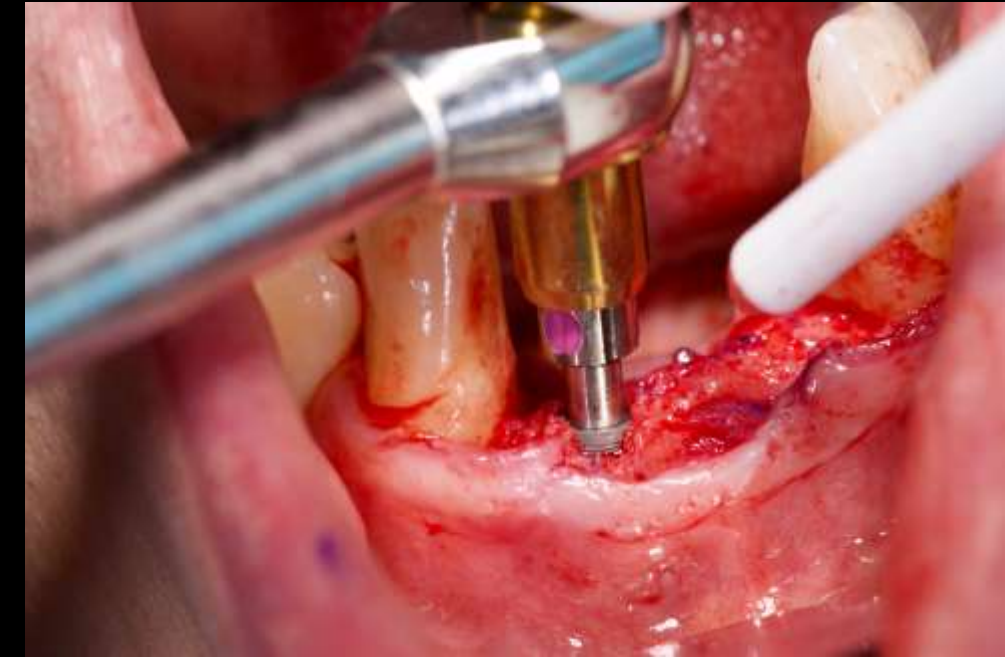
## Effect on Periodontal Structures



- Standard drills excavate bone
- No precise circumferential osteotomy.

## Traditional Implant Drills

## Effect on Narrow or less Dense Bone



- Dehiscence, buccally or lingually,
  - Poor initial stability
- May require additional procedures.

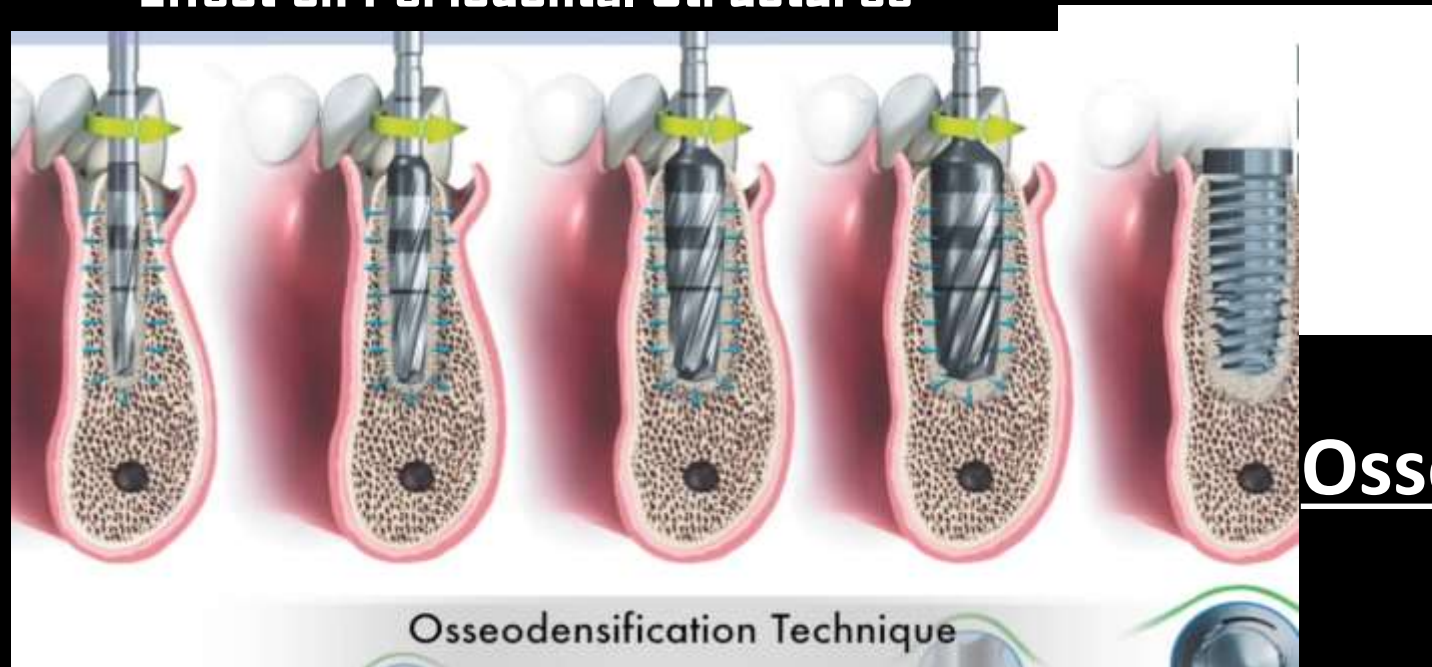
# Osseodensification Drills

This bone preservation technique is made to increase the density of the bone as they expand an osteotomy.

Proposed method of bone compaction is through the application of controlled deformation.

**Specifically indicated in poor bone quality and in cases of indirect sinus augmentation**

## Effect on Periodontal Structures



- Bone is outwardly expanding to form the osteotomy.
- Layer of bone tissue is formed along the walls and base of the osteotomy

## Osseodensification Drills

## Effect on Narrow or less Dense Bone



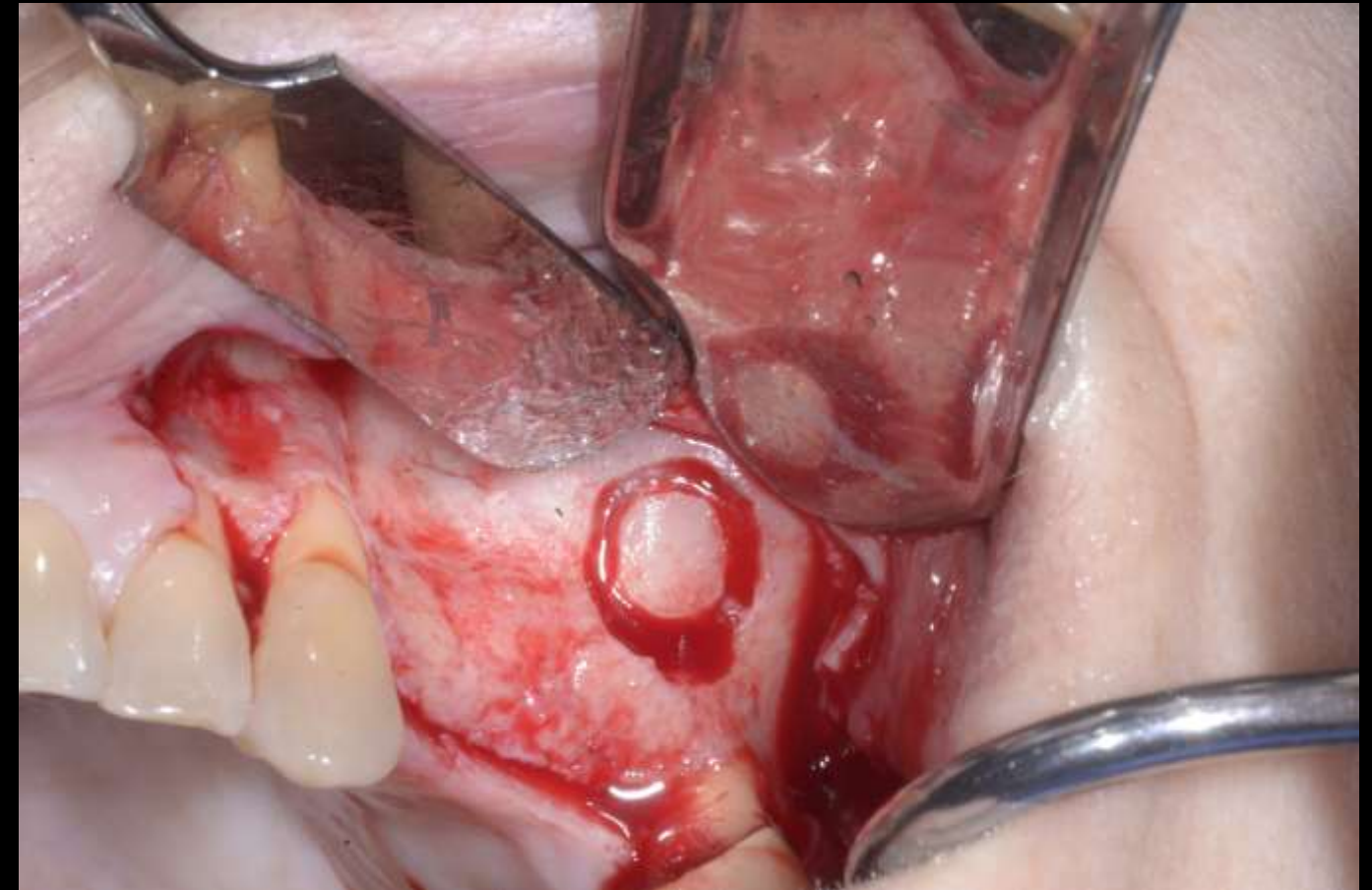
- Increases primary stability, and the percentage of bone at the implant surface.
  - Indicated for soft bone, expansion, and indirect SL

# How Do we Traditionally perform Sinus lifts?

Osteotome Sinus Lift.

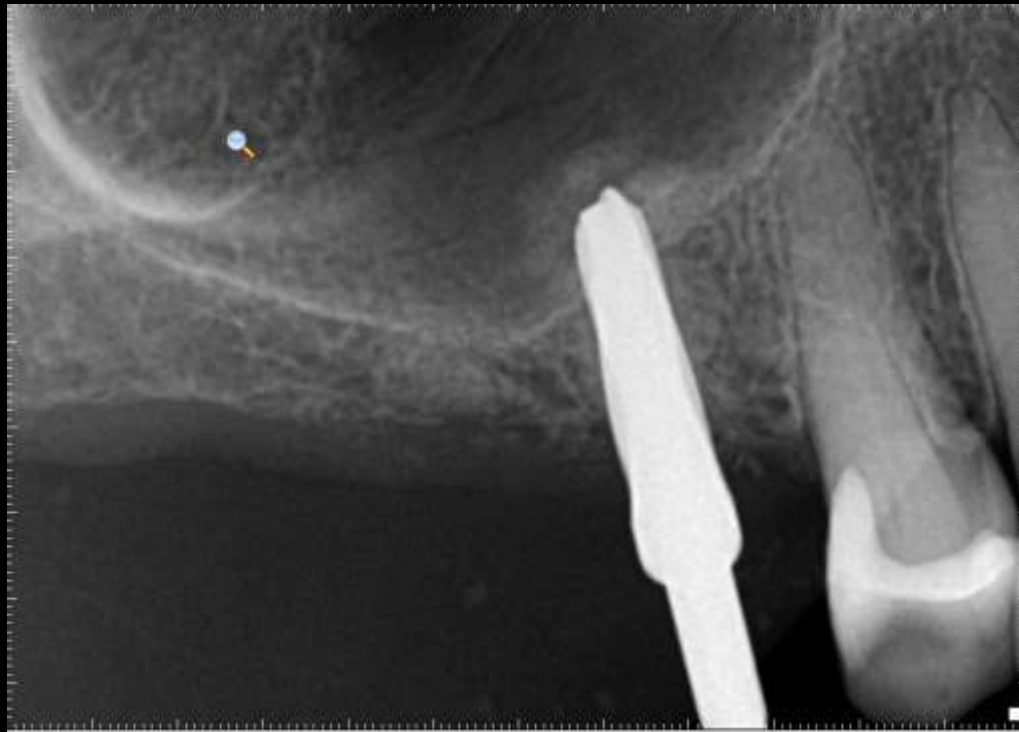


Lateral Window Sinus Lift





# Sinus Lift via Osseodensification



Placement



4.5 Months

# Current Study Objectives

**Purpose:** This study was designed as a retrospective review to evaluate the outcomes of implants placed with Osseodensification with or without sinus lift compared to implants placed with conventional drilling protocols.

**Hypothesis:** Osseodensification will result in comparable outcome values compared to traditional drilling protocols.

# Study Design/Methods

## Inclusion Criteria

- Patients who received maxillary implants between 11/1/2017 - 3/20/2020 in PGPE.



## Ossedensification vs. Controls

- OSD with and without sinus lift
- Ctrl- No indications for sinus lift or soft bone indicated.



## Parameters Examined

1. Insertion Torque Value
2. Initial ISQ, ISQ at Uncovery
3. CT Hounsfield Units
4. Smoking Status
5. Implant brand and Length
6. Medication usage



# Results

- **290 Implants**
- **162 Patients**



- 144 Implants placed in Control Group
- 146 Implants Placed with OSD
  - 74 Implants in OSD group had a simultaneous SL



- 147 Zimmer TSV
- 86 Nobel replace Tapered
- 50 Strauman BLT
- 7 Astra EV

# Patient Demographics



	Control	OSD
Age (average)	58.36	59.11
Male at implant	58	49
Female at implant	86	97
Current smokers at implant	18	24
Former Smokers (at least 1 year)	33	28
Non-Smokers	93	94
Diabetics	17	14
Non-Diabetic	127	132
Osteoporosis	10	12
Non-Osteoporosis	134	134
Bisphosphonates	5	2
Non-Bisphosphonates	139	144
SSRI	27	25
Non-SSRI	117	121
PPI	11	13
Non-PPI	133	133
Hypertension Meds	57	66
Non-Hypertension	87	80
Bone graft around DI at time of placement	35	26
No Bone graft	109	120

	Control	OSD
Total Survival Rate %	98.60	94.52

**\*\*NSSD between either group**

## Survival Rates for Patient Demographics

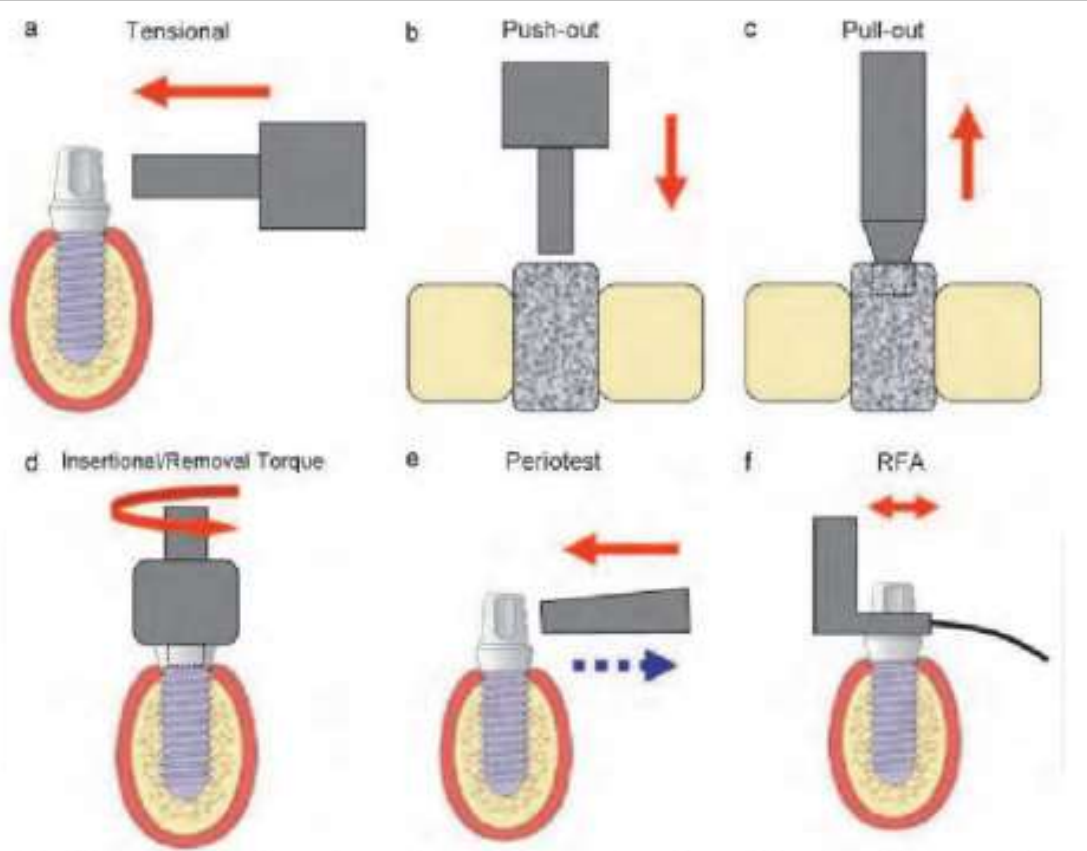
Demographics	Control	OSD
Male	98% (58)	90% (49)
Female	98% (86)	96% (97)
Current Smokers	100% (18)	96% (24)
Former Smokers	97% (33)	89% (28)
Non	98% (93)	96% (94)
Diabetic	100% (17)	93% (14)
Non-Diabetic	98% (127)	95% (132)
Osteoporosis	100% (10)	100% (12)
non-Osteoporosis	98% (134)	94% (134)
Bisphosphonates	80% (5)	100% (2)
non-Bisphosphanate	99% (139)	94% (144)
SSRI	96% (27)	96% (25)
Non-SSRI	99% (117)	94% (121)
PPI	100% (11)	100% (13)
Non-PPI	98% (133)	94% (133)
Hypertension Meds	98% (57)	97% (66)
Non-Hypertension	99% (87)	94% (80)
Bone Graft At time of placement	97% (35)	92% (26)
Non-Bone Graft	99% (109)	96% (120)



\*\*NSSD Between Groups

Age	Control	OSD
20-30	100% (1)	100% (2)
30-40	100% (14)	100% (5)
40-50	100% (14)	90% (30)
50-60	100% (44)	94% (35)
60-70	94% (36)	100(38)
70-80	100% (34)	93% (28)
80-90	100% (1)	88% (8)

# Measuring Implant Stability



RFA device

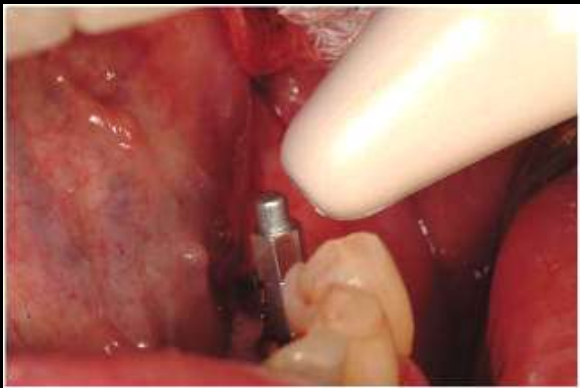


Fig. 1. Stability analyses for oral implant osseointegration from Chang, P. C., Lang, N. P. & Giannobile, W. V. (2010). "Evaluation of functional dynamics during osseointegration and regeneration associated with oral implants." *Clinical Oral Implants Research* 21: 1-12. (a) tensional test, (b) push-out test, (c) pull-out test, (d) insertional/removal torque test, (e) Periotest, and (e) resonance frequency analysis (RFA).

	Control	OSD	Survival Control	Survival OSD	Failure Control	Failure OSD
Insertion Torque values	34.08 (115)	34.01 (95)	33.95 (114)	34.11 (88)	45.00 (1)	32.86 (7)
ISQ at placement	70.44 (100)	70.92 (93)	70.44 (99)	71.09 (88)	71.00(1)	68.80 (5)
ISQ at Uncovery	75.53 (62)	73.27 (78)	75.92 (61)	73.31 (77)	52.00 (1)	75.00 (1)

\*\*NSSD

# Survival Rates by Implant Brand

Type of Implant OSD	Survival	Failure
Astra EV	100% (1)	n/a
Nobel	95% (38)	5% (2)
Straumann	94% (33)	6% (2)
Zimmer	95% (74)	5% (4)
Total	95% (146)	5% (8)



Type of Implant Control	Survival	Failure
Astra	83% (6)	17% (1)
Nobel	98% (48)	2% (1)
Zimmer	100% (73)	n/a
Straumann	100% (17)	n/a
Total	99% (144)	1% (2)

\*\*NSSD



## Survival Rates for Surgical Site



Implant site Survival rates	Control	OSD
Anterior Maxilla	96% (28)	93% (15)
Posterior Maxilla	99% (107)	94% (118)
Mandible	100% (9)	100% (13)

\*\*NSSD

## Survival Rates for Implant Length

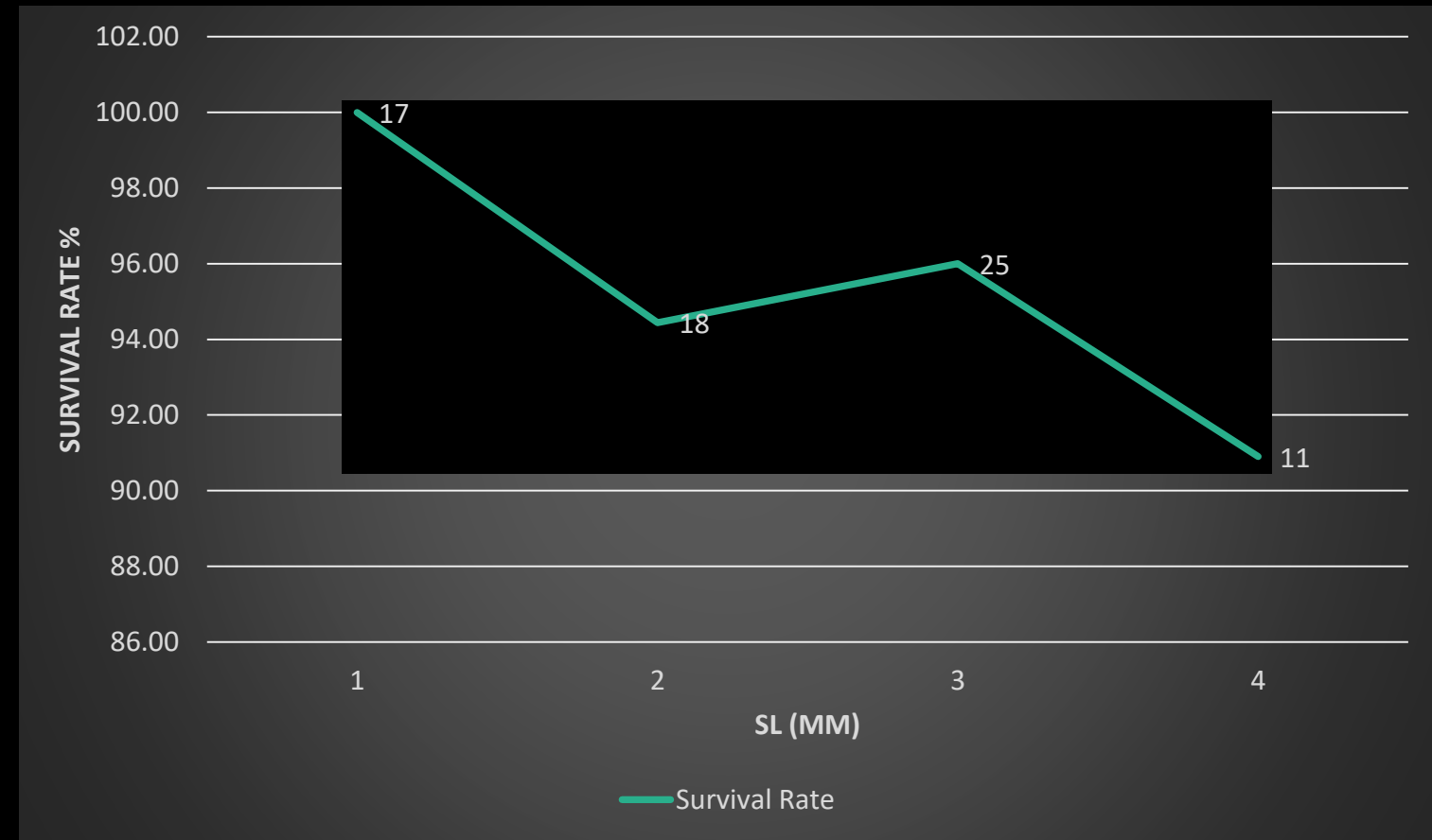


Implant Length (mm)	Control	OSD
8	100% (9)	100% (7)
9	100% (2)	100% (1)
10	100% (101)	94% (120)
11	0% (1)	n/a
11.5	100% (18)	89% (9)
12	100% (3)	100% (5)
13	92% (8)	100% (2)
16	100% (2)	100% (2)

**\*\*NSSD**

## Survival Rates for OSD Sinus Lift

OSD Group	Survival Rate
Sinus Lift (total)	95% (74)
Non SL	94% (72)
Sinus Lift 1-2 mm	97% (35)
Sinus Lift 3-4mm	92% (36)
Sinus Lift no graft	100% (30)
Sinus Lift with graft	90% (44)
Sinus Lift 1-2mm with graft in sinus	92% (12)
Sinus Lift 3-4mm with graft in sinus	90% (29)



\*\*SSD

# CONCLUSIONS

This study demonstrated that there was NSSD for most parameters for Osseodensification vs Control Implants

There was a SSD relationship within the Osseodensification group for Increasing amount of Sinus lift and the placement of a graft into the sinus.

# FUTURE RESEARCH

Larger studies are needed and direct comparison of indirect sinus lifts using  
Osseodensification and the osteotome technique.



**THANK YOU**



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**Dr. Katherine Carmona**

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