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## Use of custom silicone putty for nasal tube stabilisation in Orthognathic surgery.

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Fig. 1. Anchoring of the tube on the forehead with the silicone mould and tape after nasotracheal intubation. The putty used for this impression was Express™ VPS impression material (3M ESPE, MN, USA), and the nasotracheal tube was a Parker Flex-Tip™ cuffed nasotracheal tube (Parker Medical, CO, USA).

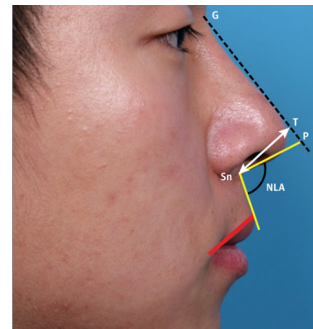
## Background

- Several factors contribute to the successful outcomes of orthognathic surgery, including the undistorted position of the nose during surgery which is the main focus in this presentation.
- Nasal intubation is predominantly used in airway management in orthognathic surgery.
- Where surgical manipulation of the mid/upper face is required, nasal intubation may interfere with accuracy of surgical treatment as it can uncontrollably distort the nose.
- Submento-tracheal intubation may therefore be a preferred method by some surgeons, however an unnecessary facial scar results .
- A method of Anchoring of a nasotracheal tube using flexible silicone putty was described in the BJOMS in 2016 as a method to reduce intraoperative shifting of the nasotracheal tube resulting in necrosis and ulceration of the nasal alar skin.
- For orthognathic surgery in RBH we have adopted this technique in attempt to reduce uncontrolled alterations of nasal proportions.

# Aims

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- To assess an alternative method involving use of silicone dental impression putty for tube stabilisation
- To assess if there is a reduction in uncontrolled alterations of naso-labial angle and inter-alar width, compared to standard nasal intubation.



# Method

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- Comparisons of pre-operative and post-operative inter-alar width and naso-labial angle were made between 2 groups of patients.
- Both groups underwent nasal intubation.
- One group of patients had securing of the nasal tube to the forehead with conventional methods of swabs & tape.
- In the second group, the custom silicone-putty device was used to secure & stabilise the nasal tube.
- Measurements of naso-labial angles and inter-alar widths were taken pre-intubation and again post-intubation to determine a difference.
- The differences were then compared between the two groups to assess potential benefits of the additional method of stabilisation.



# Mann Whitney U Test

- The Mann Whitney U Test was used to assess for significant difference in the data collected.
- Null hypothesis established.
- Significance value was set at 0.05 (5%)
- $U_{STAT}$  value calculated for both data sets
- Lowest  $U_{STAT}$  value of the 2 data sets taken
- Critical value determined at 0.05 significance – ‘41’ ( $U_{CRIT}$  – using Mann Whitney U chart )
- Significant difference → demonstrated when  $U_{STAT} \leq U_{CRIT}$  (41)
- Null hypothesis rejected if significant difference is shown.

## CRITICAL VALUE CHART

(SIGNIFICANCE VALUE AT 5%)

$n_1 \backslash n_2$	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2							0	0	0	0	1	1	1	1	1	2	2	2	2
3				0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8
4			0	1	2	3	4	4	5	6	7	8	9	10	11	11	12	13	14
5		0	1	2	3	5	6	7	8	9	11	12	13	14	15	17	18	19	20
6		1	2	3	5	6	7	10	11	13	14	16	17	19	21	22	24	25	27
7		1	3	5	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34
8	0	2	4	6	7	10	13	15	17	19	22	24	26	29	31	34	36	38	41
9	0	2	4	7	10	12	15	17	20	23	26	28	31	34	37	39	42	45	48
10	0	3	5	8	11	14	17	20	23	26	29	33	36	39	42	45	48	52	55
11	0	3	6	9	13	16	19	23	26	30	33	37	40	44	47	51	55	58	62
12	1	4	7	11	14	18	22	26	29	33	37	41	45	49	53	57	61	65	69
13	1	4	8	12	16	20	24	28	33	37	41	45	50	54	59	63	67	72	76
14	1	5	9	13	17	22	26	31	36	40	45	50	55	59	64	67	74	78	83
15	1	5	10	14	19	24	29	34	39	44	49	54	59	64	70	75	80	85	90
16	1	6	11	15	21	26	31	37	42	47	53	59	64	70	75	81	86	92	98
17	2	6	11	17	22	28	34	39	45	51	57	63	67	75	81	87	93	99	105
18	2	7	12	18	24	30	36	42	48	55	61	67	74	80	86	93	99	106	112
19	2	7	13	19	25	32	38	45	52	58	65	72	78	85	92	99	106	113	119
20	2	8	13	20	27	34	41	48	55	62	69	76	83	90	98	105	112	119	127

# Inter-alar Width Data

- Average difference IAW with no putty → 2.38mm
- Average difference IAW with putty → 1.35mm
- Use of putty reduces alterations of IAW's by average of ~1.03mm
- Mann Whitney U Test →
  - USTAT 42.5 > UCRIT 41
  - Significant difference **NOT** demonstrated for IAW

Putty Inter-alar Width		
Pre-Intubation (mm)	Post-Intubation (mm)	Difference (mm)
29	30	1
32	33	1
31	34	3
35	35	0
30	31	1
30	34	4
33	33	0
35	35	0
33	33	0
34	34	0
33	35	2
36	35	2
32.5	36	3.5

No Putty Inter-alar Width		
Pre-Intubation (mm)	Post-Intubation (mm)	Difference (mm)
36	38	2
36.5	37	0.5
30	33	3
33	36	3
35	38	3
32	34	2
35	40	5
34	38	4
34	34	0
28	34	6
36	38	2
42	40	2



# Naso-labial Angle Data

- Average difference NLA with no putty → 19.17 degrees
- Average difference NLA with putty → 0.85 degrees
- Use of putty reduces alterations of NLA's by average of ~ 18.32 degrees
- Mann Whitney U Test →
  - USTAT 0 < UCRIT 41
  - Significant difference IS demonstrated for NLA

<u>Putty</u> Naso-labial angle		
Pre-Intubation (degrees)	Post-Intubation (degrees)	Difference (degrees)
99	95	4
96	96	0
95	96	1
95	95	0
88	95	7
115	120	5
89	87	2
90	89	1
115	115	0
98	98	0
88	88	0
109	108	1
94	100	6

<u>No Putty</u> Naso-labial angle		
Pre-Intubation (degrees)	Post-Intubation (degrees)	Difference (degrees)
99	120	21
121	138	17
112	125	13
115	124	9
115	138	23
111	145	34
100	135	35
110	120	10
101	115	14
99	125	26
98	115	17
112	123	11

# Summary



- Reduced alterations in both IAW and NLA measurement was shown on average with use of putty.
- Significant difference was **NOT** demonstrated in IAW measurements with use of putty stabilisation.
- Significant difference **WAS** demonstrated in NLA measurements with use of putty stabilisation.
  
- Silicone dental impression putty is relatively cheap to use.
- Can be effectively used to prevent nasal septa distortion during orthognathic surgery.
- Aids in the maintenance of facial symmetry and bony contours, avoiding the need to use submental intubation.





# References

- 1) *Ogawa T, et al., Anchoring of a nasotracheal tube using flexible silicone putty. Letters to the Editor / British Journal of Oral and Maxillofacial Surgery 54 (2016) 475–480*
- 2) *Beck J, Johnston K. Anaesthesia for cosmetic and functional maxillofacial surgery. Continuing Education in Anaesthesia Critical Care & Pain, Volume 14, Issue 1, February 2014, Pages 38 - 42, <https://doi.org/10.1093/bjaceaccp/mkt027>*
- 3) *Mitchell V. Anaesthesia for orthognathic surgery | Oxford Textbook of Anaesthesia for Oral and Maxillofacial Surgery | Oxford Academic (oup.com), pages 240-252. June 2010 <https://doi.org/10.1093/med/9780199564217.003.0018>*
- 4) *Malhotra N, Retromolar intubation – a simple alternative to submental intubation - Malhotra – May 2006 - Anaesthesia - Wiley Online Library 61(5) pages 515-516*
- 5) *Altman JJ, Oeltjen JC. Nasal deformities associated with orthognathic surgery: analysis, prevention, and correction. J Craniofac Surg. 2007 Jul;18(4):734-9. doi: 10.1097/SCS.0b013e3180684328. PMID: 17667658.*
- 6) *O'Loughlin E, How To... Perform the Mann-Whitney U Test (By Hand) - YouTube*