

# Status of the Uncinate process in patients with sinusitis in a south Indian population- CT scan assisted anatomical and clinical study

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## Abstract

**Introduction:** The Anatomical variations in the Uncinate process may alter the sinus outflow tract causing sinusitis. **Aim:** To find out the status of superior attachment of uncinata process and its variations with age and gender. **Materials and Methods:** The Patients with symptoms of sinusitis who were willing to take CT scan for paranasal sinuses were included and images were analyzed. The superior attachment of Uncinate process is classified as **Type 1**-Insertion of Uncinate process into the lamina papyracea, **Type 2**- Insertion of Uncinate process into the roof of the ethmoid (the skull base), **Type 3**- Insertion of Uncinate process into the middle turbinate. The data were interpreted by using the chi square statistical test. **Results:** Type 1 uncinata process is the most common type found and second most common type is the Type 2 in all age group and both sexes. **Conclusion:** A detailed knowledge about the anatomical variations in the Uncinate process is essential for the surgeons to avoid intra operative complications and for the Radiologist to interpret the CT Scan images.

**Keywords:** CT scan, Sinusitis, Uncinate process.

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## INTRODUCTION

Uncinate process is the curved bony process projecting postero inferiorly from the ethmoidal labyrinth. It forms the boundaries of hiatus semilunaris and ethmoidal infundibulum through which maxillary, Anterior ethmoidal and frontal sinus drains.<sup>1</sup> Anatomical variations in the Uncinate process is not an uncommon finding in

routine CT scan evaluation of patients with sinusitis.<sup>2-5</sup> The modern treatment of sinusitis involves removal of the uncinata process in infundibulotomy by Functional Endoscopic Sinus Surgery.<sup>6-8</sup> A thorough knowledge of Anatomic variation of uncinata process prevent the intra operative complications like damage to the vital structures like nasolacrimal duct, medial orbital wall and sphenopalatine artery, Ethmoidal roof etc.<sup>9,10</sup> The objectives of our present study are to find out the status of the superior attachment of uncinata process and its variations with age and gender in south Indian population.

## MATERIAL AND METHODS

The study was conducted in the Chennai Medical College Hospital and Research Centre, Irungalur, Trichirapalli, Tamilnadu, India. A prospective study was conducted during the period July 2012 to July 2014. The Patients with symptoms of sinusitis attending ENT Department were considered for the study after getting the informed

consent. Totally 200 sides of 100 consecutive patients who were willing to take CT scan for paranasal sinuses were included. Patients with previous nasal and paranasal sinus surgery, neoplastic diseases, history of nasal trauma and pregnant women were excluded.

**Brief methodology for the Study design**

This is the Observational type of cross sectional study. The images were taken using Dual slice GE Hispeed CT Scanner with 2 to 3mm thickness coronal and axial images with scan time of 49.5 sec. The images were analyzed to find the superior attachment of Uncinate process. The superior attachment of Uncinate process is classified as **Type 1**-Insertion of Uncinate process into the lamina papyracea, **Type 2**- Insertion of Uncinate process into the roof of the ethmoid (the skull base), **Type 3**- Insertion of Uncinate process into the middle turbinate.

**Statistical Analysis**

The data were interpreted by using the chi square statistical test with Statistical program for Social Science (SPSS) version 16.0. A p-Value < 0.05 was considered statistically significant.

**RESULTS**

The study group comprises of 71 men and 29 women (age 15 to 60years). In the total of 200 sides we could able to identify the superior attachment of uncinat process in 160 sides (80%), remaining 40 sides (28 sides in men and 12sides in women) (20%) we are not able to identify the superior attachment of uncinat process. Type 1 uncinat process was found in 94 sides (59%) of the total 160 sides among that 68 sides (43%) in men and 26(16%) in women. Type 2 uncinat process was found in 38 sides (24%) of the total 160 sides among that 26 sides (16%) in men and 12(8%) in women. Type 3 uncinat process was found in 28 sides (17.5%) of the total 160 sides among that 20 sides (12.5%) in men and 8(5%) in women. The distribution of the status of the uncinat process in relation to age and sex is given in Tables 1, 2, 3 and Fig 1.

**Table 1:** The Type of superior attachment of uncinat process in relation to age in Men

Age	*NI (Sides)	Type 1 (Sides)	Type 2 (Sides)	Type 3 (Sides)
15-30	16	40	17	13
31-45	8	18	5	5
46-60	4	10	4	2

**Table 2:** The Type of superior attachment of uncinat process in relation to age in Women

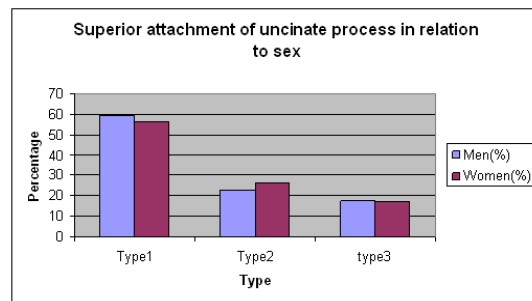
Age	*NI (Sides)	Type 1 (Sides)	Type 2 (Sides)	Type 3 (Sides)
15-30	8	12	5	3
31-45	3	8	3	2
46-60	1	6	4	3

**Table 3:** The Type of superior attachment of uncinat process in relation to sex of the patient

Type of uncinat process	Men (Sides)	Women (Sides)
*NI	28	12
Type 1	68	26
Type 2	26	12
Type 3	20	8

\*NI- Not Identified the superior attachment of uncinat process

**Figure 1:** The superior attachment of uncinat process in relation to sex of the patient



**DISCUSSION**

Chronic rhinosinusitis presented with its symptoms of nasal obstruction, nasal discharge, headache and facial pain. Anatomical variations in the superior attachment of uncinat process may alter the normal Anatomy of Osteomeatal complex thus proper drainage of sinuses causing sinusitis. The knowledge about the uncinat process variation is important for the surgeons to avoid intra operative complications and also for the radiologists to interpret the CT scan images. Out of the 200 sides superior attachment of uncinat process was not able to identify in 40 (20%) sides which was lower than that of 34.71% reported by Krzeski *et al*<sup>11</sup> and 40% reported by Landsberg and Friedman<sup>12</sup> but similar to 16% reported by Isha Preet Tuli *et al*<sup>13</sup> and 26% reported by Turgut *et al*<sup>14</sup>. Type 1 uncinat process is present in 94 (59%) sides, which is the commenest type found in our study. This percentage of presentation is Similar to min *et al*<sup>15</sup> 54% and Landsberg and Friedman<sup>12</sup> 52%, higher than Krzeski *et al*<sup>11</sup> 17.83% but Lower than Isha Preet Tuli *et al*<sup>13</sup> 79.8%,Turgut *et al*<sup>14</sup> 63% and Shao-Cheng Liu *et al*<sup>16</sup> 70.4%. Type 2 uncinat process is present in 38 (24%) sides, which is the second most common type found in our study similar to Turgut *et al*<sup>14</sup>, Isha Preet Tuli *et al*<sup>13</sup>. This percentage of presentation is similar to min *et al*<sup>15</sup> 24.5% but higher than that of 6.1% reported by Shao-Cheng Liu *et al*<sup>16</sup>, 14% reported by Turgut *et al*<sup>14</sup>, 16.67% reported by Isha Preet Tuli *et al*<sup>13</sup> and this is lower than that of 33.12% reported by Krzeski *et al*<sup>11</sup>. Type 3 uncinat process is present in 28 (17.5%) sides. This is similar to min *et al*<sup>15</sup> 21.5% but higher than that of 3.57%,8%,10.2% and 14.33% reported by Isha Preet Tuli *et al*<sup>13</sup>, Turgut *et al*<sup>14</sup>, Shao-Cheng Liu *et al*<sup>16</sup> and Krzeski

*et al*<sup>11</sup>. In our present study, Type 1 uncinate process is the most common type, Type 2 uncinate process is the second most common type and type3 uncinate process is the least common type in all age groups and in both sexes (Ref. Tables 1, 2, 3 and Fig 1) this is similar to the data reported by Isha Preet Tuli *et al*<sup>13</sup>. The detailed knowledge about the anatomical variations in the superior attachment of uncinate process is necessary for the surgeons because in the most common Type 1, Uncinate process is attached to the laminapapyracea when we plan to remove the Uncinate process during FESS care must be taken because of the increasing risk of penetration of orbit causing serious complications. When the Uncinate process is attached to the ethmoidal roof (Skull base) or middle turbinate while doing the uncinectomy chances of injuring ethmoidal roof causing CSF rhinorrhea and other intracranial complications should be kept in mind

## CONCLUSIONS

So the knowledge about the anatomical variations in the superior attachment of uncinate process is necessary for the surgeons to prevent the intra operative and postoperative complications and for the Radiologist to interpret the CT scan images.

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