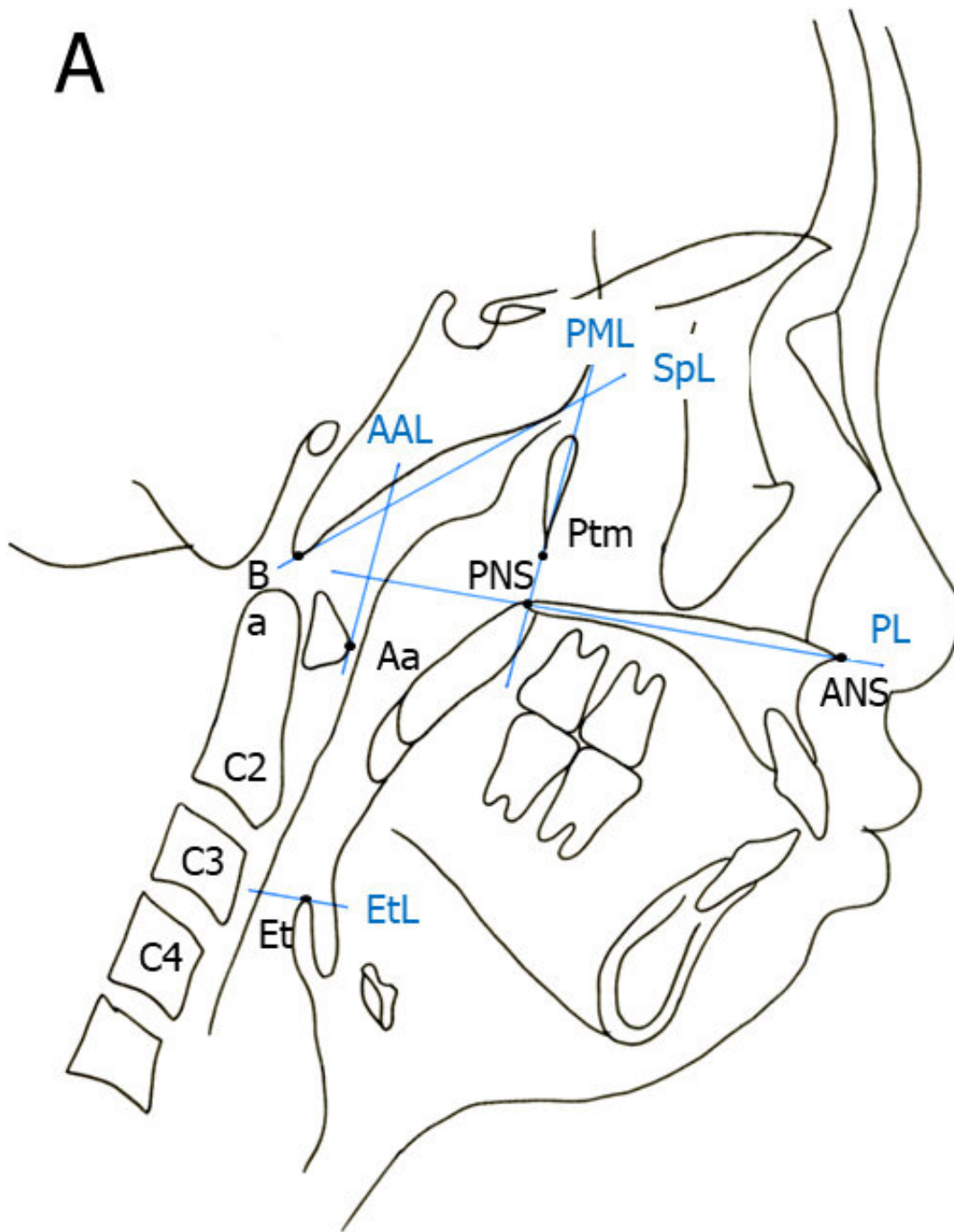


# **New research challenges medical consensus that adenoids and tonsils significantly shrink during teenage years**

February 11 2019

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Abbreviations: Aa, anterior medial point of the atlas; AAL, anterior atlas line (line perpendicular to the palatal line registered on the anterior medial point of the atlas); ANS, anterior nasal spine; Ba, basion; C2, second cervical vertebra; C3, third cervical vertebra; C4, fourth cervical vertebra; Et, epiglottis; EtL,

epiglottis line (line parallel to the palatal line registered on the most superior point of the epiglottis); PL, palatal line (line from the anterior nasal spine to the posterior nasal spine); PML, pterygomaxillary line (line perpendicular to the palatal line registered on the pterygomaxillon); PNS, posterior nasal spine; Ptm, pterygomaxillary fissure; SpL, sphenoid line (line tangential to the lower border of the sphenoid registered on the basion). Credit: Department of Orthodontic Science, TMDU

In the most thorough longitudinal study performed to date, X-ray images of children at five developmental stages between the ages of eight and 19 were carefully measured (Fig. 1 A,B). The researchers report that the adenoids and tonsils do not shrink significantly during the teenage years, which may reshape the guidelines for when an adenotonsillectomy should be performed to treat respiratory complications, e.g., obstructive sleep apnea (OSA).

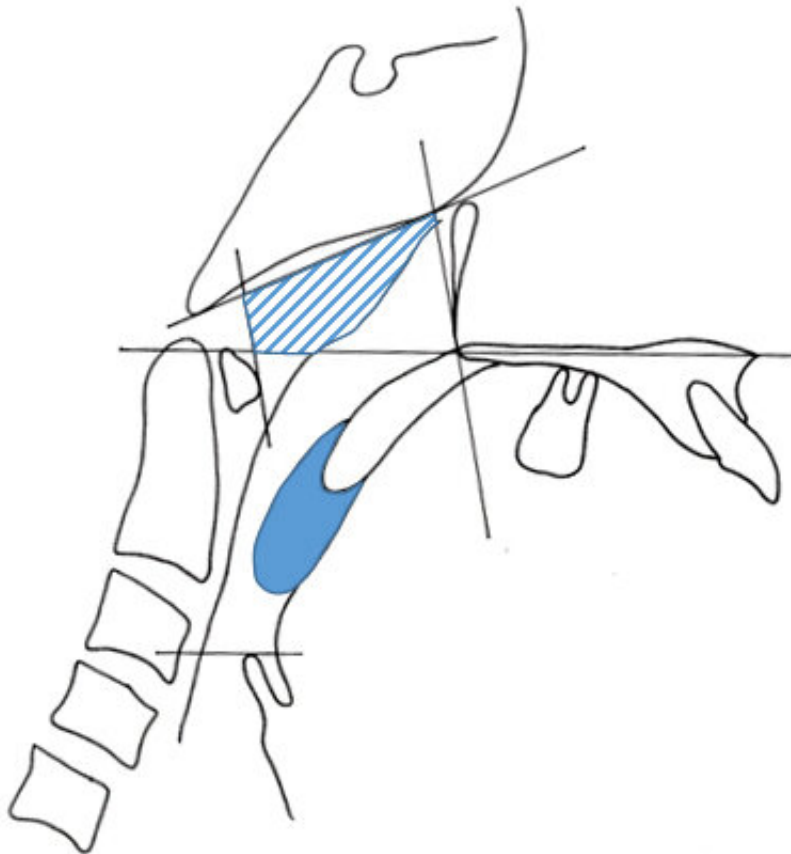
The adenoids and tonsils are small regions of tissue at the back of the throat that help the body's immune system fight ingested and inhaled pathogens. The removal of inflamed adenoids and tonsils often occurs in childhood, though most people who have a tonsillectomy today do so to treat OSA. Patients with OSA often have trouble sleeping due to enlarged adenotonsil tissues, and usually, the adenoids and tonsils are surgically removed at the same time (adenotonsillectomy).

Since 1923, when Dr. Richard Scammon first published graphs of growth patterns in the [human body](#), it has been the medical consensus that the lymphoid tissues, which include the adenoids and tonsils, peak in size around 12 years old, and then shrink to reach their adult shape by about age 20. Now, a study by a team led by researchers at Tokyo Medical and Dental University (TMDU) challenges this belief, and reports that the adenoids and tonsils remain more or less constant in size from lower primary [school](#) through young adulthood. These results will

be important for primary care physicians and orthodontists for determining when surgery is indicated.

For the current research, the team chose to do a [longitudinal study](#), which follows specific individuals over time, instead of an easier cross-sectional study, which observes various age groups at once. "Although more intensive than cross-sectional studies, longitudinal observational studies are more suitable for assessing the complex growth patterns seen in individuals," says lead author Takayoshi Ishida.

## B



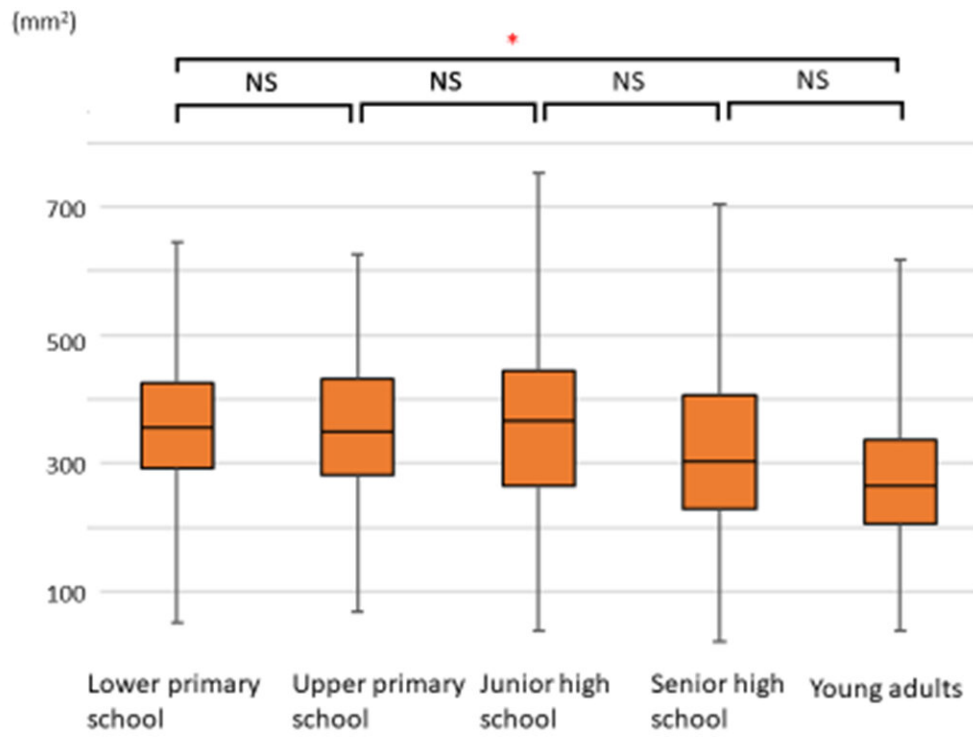
The partially shaded region represents the Ad area, and the part in solid colour represents the Tn area. Credit: Department of Orthodontic Science, TMDU

The researchers obtained lateral cephalometric radiographies, which are standardized and highly reproducible, from 90 samples (same individuals) from a database of 23,133 patients. For each individual, the adenoid and tonsil sizes were measured at five developmental stages:

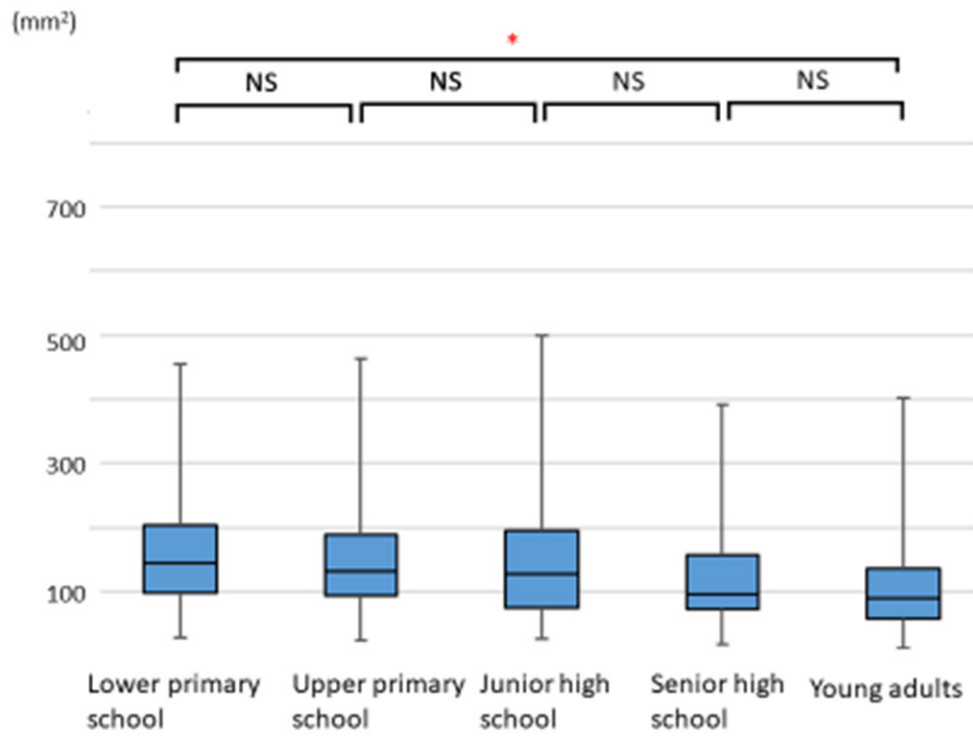
lower primary school (age eight), upper primary school (age 10), junior high school (age 13), senior high school (age 16), and young adult (age 19). The researchers found that the size of the adenoids and tonsils did not significantly vary among age groups, except when comparing the oldest with the youngest groups (Fig 2).

The previous understanding may have arisen because the surrounding regions of the throat also grow rapidly in teenagers. "We found that, in actuality, the airway itself grows bigger, making the fraction taken up by the adenoids and tonsils smaller," says senior author Takashi Ono. The work, published in *Scientific Reports*, is titled "[adenoid](#) and [tonsil](#) growth in Japanese children and adolescents: A longitudinal study."

A



B



Error bars denote 95 percent confidence interval determined by bootstrap analysis of 1,000 iterations. A) Age-dependent changes in the adenoids (Ad). A comparison of the Ad among the age groups revealed no significant changes. ( $347.55 \pm 12.52$ ,  $346.22 \pm 12.63$ ,  $355.41 \pm 14.51$ ,  $316.62 \pm 14.38$ , and  $274.48 \pm 13.03$  mm<sup>2</sup> in the lower primary school, upper primary school, junior high school, senior high school, and young adult groups, respectively). B) Age-dependent changes in the tonsils (Tn). A comparison of the Tn among the age groups revealed no significant changes. ( $161.34 \pm 9.54$ ,  $152.82 \pm 9.35$ ,  $145.46 \pm 9.59$ ,  $127.64 \pm 8.48$ ,  $110.97 \pm 8.19$  mm<sup>2</sup> in the lower primary school, upper primary school, junior high school, senior high school, and young adult groups, respectively). Credit: Department of Orthodontic Science, TMDU

**More information:** Takayoshi Ishida et al, Patterns of adenoid and tonsil growth in Japanese children and adolescents: A longitudinal study, *Scientific Reports* (2018). [DOI: 10.1038/s41598-018-35272-z](https://doi.org/10.1038/s41598-018-35272-z)

Provided by Tokyo Medical and Dental University

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