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Conception and nasal measurements of a new nasal dilator

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Mechanical nasal dilators increase temporarily the nasal valve section which decrease the nasal resistance and facilitate the nasal air flow. The aim of this study is to present a new original conception of an external nasal dilator and assessment of necessary forces to obtain the optimal effectiveness / tolerance ratio. The final geometry of the device is the result of tests on many nose mouldings. The prototype is made of Beta-Titanium alloy for its elastic properties and biocompatibility. Internal parts are made of silicones to improve the comfort. Forces dilate bilaterally by pushing on cutaneous internal part of nasal wings. A medial contact with the nasal bridge can fix and improve support of the device. The tolerance of the device was assessed by progressive increasing nasal dilations in a sample of 21 healthy adults between 18 and 60 years old. A specific flexion machine (GT-Test Gmbh Universal testing machine, 20 Newton cell) was adapted to assess device's bending forces according to measured nasal dilation. The average nasal breadth at rest is 25,10±3,45mm ; the upper limit of comfort sensation is 34,10±2,98mm ; the upper limit of discomfort sensation is 37,33±3,24mm and the beginning of pain sensation is 39,20±3,44mm. The average nasal dilation is 33,43±2,65mm resulting of device's deflection forces between 0,45 and 0,50 Newton. The optimal nasal dilation results of forces included in upper limit of comfort's sensation interval. The external part of the device which is very light and thin, allows free variations of deflection forces. The internal part made by silicones, let optimal distribution of stress forces on biological tissues. These measures confirm the interest of this new nasal dilator in chronic nasal obstructions.

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