# Distinguish males and females using the mandibular canine tooth

Rao and collaborators developed a methodology based on the mandibular canine to estimate the sex of an individual. Using this methodology, called mandibular canine index (MCI), the authors proposed a cut-value above which the subjects should be classified as males, and below it, as females. According to these authors MCI could predict sex correctly in a high number of cases (above 90%).

In our work we have tested MCI using Rao's proposed cut-value and found out a low accuracy in sex classification. In fact, only 54.2% of our classifications turned out to be correct, which is a very poor result, particularly if you think you're able to get to 50% just by turning a coin. So, we thought that two things may be explain our bad results:

> The studied population for establishing the cut value: Rao's study was carried out in an Indian sample, in which females exhibited MCI values much lower than those of males, with little overlap of measures. In our sample from the Portuguese population, females exhibited MCI values much higher than Indian females and quite similar to Portuguese (and Indian) males, resulting in a much bigger overlap of measures curves.
> Environmental factors: The study performed by Rao was carried out in 1989, and ours in 2015. Naturally, environmental conditions are not the same, and people from 25 years ago are different from those from today.

Bearing these in mind, we've searched for a new cut-point and were able to raise our accuracy level by 10%, performing 64.2% of correct sex predictions. Of course, this value can still be improve and we intend to keep working in order to be able to perform more correct sex estimations using the mandibular canine.

The importance of this study relates with human identification in forensic context. In fact, sometimes bodies are so destroyed that there is little remaining. As teeth are known for being the most resistant structures of the human body and they play a major role in identifying skeletal remains. In fact, in such circumstances, teeth can be very useful, aiding a subject's identification. There are other non-dental techniques that have high efficiency in sex estimation. For example, craniofacial morphology and pelvic measurements can correctly predict sex in a range from 96% to 100% in sex estimation. However, it is not uncommon to recover only partial human remains, or fragmentary skull and pelvic bones. In such cases, teeth can be especially useful, since they are known to resist a great variety of physical, chemical and biological insults. So, improving the results of dental techniques for sex estimation is of great importance.

## Publication

A new approach to sex estimation using the mandibular canine index
Silva AM, Pereira ML, Gouveia S, Tavares JN, Azevedo Á, Caldas IM.
*Med Sci Law. 2015 Mar 22*