Editorial

Animal Research in Orthodontics. What's the Point?

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Editorial

Animal Research models have numerous limitations for dentistry and medicine.

Their results can't be extra polated truthfully. It's important to take into account that there are two major uncertainties with using animal models to understand human diseases.

Firstly, there are significant species differences in anatomy, metabolism, physiology or pharmacology caused by under lying genetic variations, that include regulatory genes. This means that even minor molecular differences may be amplified when extra polated to the cell-organ or species- levels. This variations between species can and do regurlary confound the translation of laboratory animal results to human.

A second major cause of uncertainty with animal models is the nature of the conditions inflicted on them. Human illnesses are researched in animals precisely because there is a lack of knowledge about them. Most often, the causes and progression of a Human conditions are unknown although the range of symptoms is understood. An animal model is usually developed on the basis of a narrow range of human symptoms, selected at a time when researchers often do not know which disease characteristics are the most important, or even which are causes rather than outcomes of illness [1,2].

Recently it's been proved that, although acute inflammatory stresses from different etiologies result in highly similar genomic responses in humans, the responses in corresponding mouse models correlate poorly with the human conditions and also, one another. In addition to improvements in the current animal model systems, the new study tendencies supports higher priority for translational medical research to focus on the more complex human conditions rather than relying on mouse models to study human inflammatory diseases [3].

When properly conducted, systematic reviews (SRs) and meta-analyses are ranked high in the pyramid of evidence, and their results can influence clinical decisions and serve as a foundation for evidence-based practice guidelines. However, SRs can be prone to biases originating from poor quality of the included studies, heterogeneity among studies, and posible publication biases [4].

Then, to include animal studies in a systematic review, takes

the article apart from any clinical use, and denies the possibility of providing conclusions about human effects. Also, these types of studies are not included on the evidence scale, or they are classified below expert opinions [5-7].

Particularly in orthodontics animal research models are used to study biomechanic, new technics and movement acceleration methods. Even orthodontics practice, specially dental movement biology at the alveolar bone, it's explained thru an animal model made over 100 years ago [8].

Pain, for example, is difficult to evaluate. It has subjective components, but it is usually reported by the patients and considered in scientific literature as a relevant factor in determining the patient's decision to continue or not continue orthodontic treatment [9-15].

O'Connor et al. reported in 2000 [16] that pain during treatment is the fourth most frequent reason for fear and apprehension in patients initiating any orthodontic treatment. Pain is a subjective response that depends upon many factors including age, gender, individual threshold, level of tolerance, emotional status, stress, cultural differences, and previous pain experiences [17-20].

Despite the above, animal research models were used to try different methods to validate a very complex subject as stimulus pain perception, which is difficult to interpretate for its multifactor components in Humans, then it will be almost impossible to be extrapolated to rats.

My special invitation through this editorial it's to reevaluate future animal testing research in orthodontics or general dentistry, considering the new and multiple methodological options to develop safe and ethical protocols for human studies that will allow us to produce scientific based answers and fundamentals for our clinical practice. Animal testing and research it's out of this scenario so... What's the point?.

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