Measurements must be interval, not ordinal

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Someone once said that orthodontics is a 3 mm occupation. This comment was not meant to depreciate our clinical ability in the patient's mouth, but rather to indicate that an untrained person's visual cognitive threshold is around 3 mm. At the finishing stage of treatment, if a midline deviation is less than 3 mm, we can usually manage it; if more than that, we ought to sweat to fix it.

Although we brag about our clinical precision, we often base clinical decisions on ordinal perceptions, not measurements, especially during an interview with a new patient. After screening a potential patient, instinct usually tells us if this will be a difficult case or an easy one. How? Before measuring anything, we quickly compare the new case with our experience-archives and rank it into the position where it most likely fits. Direct measurements hardly influence that first decision made with clinical intuition. This may be why observations are ordinal.

Ordinal data are particularly useful for surveys because they help us make a decision easily and quickly. Checking along the scale in questionnaires, we can quickly determine where a particular case belongs—mild, average, or severe. But ordinal measurements present a few innate problems. First, the origin of measurements is not well defined, and your starting point is not always the same as mine. Second, the scale is not linear, and the difference between 1 and 3 on an ordinal scale may not be the same as the difference between 5 and 7, even though both are exactly 2. We all have an inconsistent rubber ruler in our minds!

or·din·al ***adj.*** expressing order or succession, specif. of a number in a series

In the short period of time since its birth, the PAR index appears to have become the gold standard for evaluating malocclusion. While this may indicate a superiority of the PAR index over other indices, it is important for users to understand the fundamental problems this ordinal measurement carries. I am not insisting that we must intervalize all scaling indices, because there are many times continuous measurements do not really indicate what they mean. For example, a 1 mm difference in orthodontics is often ignored because it does not mean much clinically. When a change this small does become important, however, it might be better to convert it back to and ordinal scale to fully express its importance. Measurement, however, still must be interval, not ordinal. In other words, we cannot use the mean and standard deviation of measurements as if they were continuous due to the reasons illustrated above. Thus, when dealing with ordinal data as measurements, appropriate statistical methods must be implemented.

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