**Critical Appraisal of the Scientific Literature**

* **Subjects :**
* Are they representative of the target population?
* Were they randomly selected?
* Inclusion and exclusion criteria: must be set from the beginning of the study.

For example if we are looking at the prevalence of malocclusion, you will exclude patients who had braces or extractions before because this will affect negatively on the results.

* Are experimental groups matched (Age, sex, etc.)?

The groups must be matched and the same before you start; must have the same age and the same gender.

* Is there a control group?

Control group is needed to know if the difference is due to intervention or not. For example if we are comparing two types of braces and development of white spot lesions, we must have a control group because white spot lesions can develop without any intervention.

Unless we have a control we can't say that our intervention worked.

* **Methods :**
* Should describe in great detail how the study was carried out.
* It should enable the reader to potentially replicate the study.
* **Results :**
* Should list as simply as possible the data that specifically addresses the original objectives or hypothesis of the study.
* Should be concise and to the point.
* There is no need to have much information that is not related to the study or not related to what you are testing.
* **Statistical Analysis :**
* The statistical analysis that you use should be the simplest statistical test that can be used ex. T-tests, non-parametric tests, ANOVA.
* No need to use very complicated tests
* Selection of appropriate statistical tests according to the type of data gathered
* Study of interactions between various variables: make sure that you study other variables that may also have an effect on what you are testing.
* **Discussion :**
* Authors can give their own opinion on the importance or application of the results of the study and give explanation of the results.
* Relates finding of present study to previous information in the field.
* This is the only place where the authors can give their opinion.
* **Conclusion :**
* Clear conclusions based on the results.
* The “take-home” message of the study.
* **Types of Studies :**

1. Descriptive / Observational: based on observations by looking to what happens by your eyes.
2. Cross- Sectional / Experimental: look at certain group of people at a certain time.
3. Longitudinal: follow the group for a long time.
4. “Traditional” Review: make a summary for all the papers that talk about a certain topic.
5. Systemic Review: make a summary for certain papers that match the criteria that you put, so you don’t summarize all the papers that talk about the topic.

For example you only choose the randomized control studies.

1. Meta-Analysis: when you analyze systemic reviews.
2. Cochrane Collaboration: group of scientists that are put together to do meta-analysis for systemic reviews which gives the highest level of evidence.

They publish it on two levels: for the specialists and for the patients (for the public in a simple language and found on internet for free).

* **The Hierarchy of Evidence :**

1. Case Report: least level of evidence
2. Case series
3. Retrospective comparative studies
4. Prospective comparative studies
5. Randomized prospective controlled trial: very expensive, hard to set up and needs time (takes 5-10 years).
6. Meta of randomized controlled trial

* **Common Mistakes in the Literature :**
* Objectives not clearly stated: causes the paper to be rejected.
* Hypothesis (Null) not stated: till now we can’t reject a paper based on that, can be corrected by the author.
* No ethical approval: causes the paper to be rejected.
* Introduction too long: can be corrected.
* Sample selection not clearly defined: can be corrected.
* Methods not clearly described: can be corrected.
* Use of statistical analyses to find meaningful results: can be corrected.
* Results too long and not relevant: can be corrected.
* Results not clinically significant: can be corrected.
* Conclusions not based on results: can be corrected.

**Good luck ☺**