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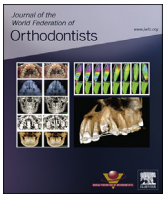

Editorial

From 4S to 6S: The growing evidence-based pyramid

Evidence based practice combines three key elements of knowledge gaining—evidence (generated through research), statistics (from audit and routinely collected data) and experience (gained from patient treatments). It is mandatory that clinicians adopt knowledge that one acquires from quality research after the assessment of balance between its strengths and weaknesses. Care should be taken to select those studies in which strength outweighs the flaws. The steps in evidence based practice can be summarised into **5A**'s—**Ask** (reaching focused clinical question through PICO (T) format—problem/patient, intervention, comparison, outcome and optional time element), **Acquire** (search for evidence), **Appraise** (critical evaluation of available evidence for validity), **Apply** (integrate evidence with clinical expertise and patient characteristics) and **Assess** (performance evaluation) [1]. With the incorporation of improved information technology and systems which help in the robust synthesis of evidence as derived from clinically important studies, the process of gaining validity has become much easier for the clinician to apply. The classic pyramid of evidence forms the fundamental tool for evidence-based practice. This occurs by arranging available evidence with the help of consistent methodology and internal validity from bottom (low level such as case reports) to top (highest level such as systematic reviews and meta-analysis).

The first attempt to classify evidence into five levels was proposed by Sackett in 1989 [2]. According to him there exists three grades of recommendation with available evidence—**Grade A** (level I- large randomized trials with low risk of error), **Grade B** (level II—small randomized trials with uncertain results) and **Grade C** (level III—non-randomized contemporaneous controls; level IV—non-randomized historical controls and level V—no controls or case series only). Brain Haynes proposed a 4S hierarchical system of evidence-based pyramid (Studies, synthesis, synopses and systems) in 2001 with original published studies in the base and computerized decision support systems on top [3]. He further refined it to a 5S system incorporating summaries published in evidence based text books below the systems section [4]. Dicenso, Bayley and Haynes together refined the 5S model to a 6S format incorporating one more tab just above single studies—synopsis of single studies—making it much more encompassing [5] (Figure 1).

Studies, the base of the evidence pyramid, denotes non-appraised or non-filtered evidence accessible through traditional databases such as MEDLINE, EMBASE, CINAHL and searched for with keywords. It is the duty of the reader to appraise the strength of the research before considering it as evidence or not. In the absence of higher-level evidence such as synthesis or systems, the next source of search will be ***synopsis of studies***, a brief summary of the study along with an appraisal of its strength, weakness and clinical applications. It is a fact that individual studies, even quite rigorous and scientific, will not provide us with enough evidence to make the very best practice decisions. ***Synthesis***, the third block in the evidence pyramid provides comprehensive summaries of related research to a focused question. Systematic reviews, the typical example of synthesis, pulls up multiple studies focused on same question even with differing results, and provide us with an unbiased summary of evidence using transparent, organized and replicable procedures. Guidelines for the procedure to be followed are brought out by Cochrane institute, Campbell collaboration and Joanna Briggs institute. There exists an assumption that only randomized control trials (RCT) can be used for systematic reviews while the fact is that the type of question posed by the researcher determines the best design. In some cases, especially in the field of orthodontics, studies with the preferred research design (RCT) may not be available leading to a systematic review summarizing the best available literature on the topic.

Critical appraisal of systematic reviews along with short, concise, user-friendly assessment and summary of evidence is the next higher level of evidence—***synopsis of synthesis***. These types of articles frequently appear in dedicated evidence-based journals and often meet the screening criteria of strengths surpassing study flaws. ***Summaries***, the next tier integrates the lower tiers of the pyramid such as studies, synopses and synthesis and provide us with full range of evidence for effective management of the problem at hand. Summaries are placed higher in order because lower tiers tend to target one aspect of the problem while at summary level, all aspects of the problem and management are integrated to create a comprehensive evidence-based synopsis. Recent years have witnessed the appearance of evidence summation services that constantly update clinical electronic textbooks as sources for evidence integrating the best available systematic reviews and primary studies. Examples of such sites are Clinical Evidence, Dynamed, UpToDate and PIER (physicians' information and education resource). The top tier of the pyramid, ***systems***, integrates and summarizes all relevant and important research evidence about a clinical problem, updates it as and when available and automatically links a specific patients' circumstances to the relevant information through electronic medical records (EMR). Systems take advantage of computerized decision support systems (CDSSs) which provide the clinician with patient specific recommendations based upon algorithms in the knowledge database when the detailed patient data is entered to the program. If such a system

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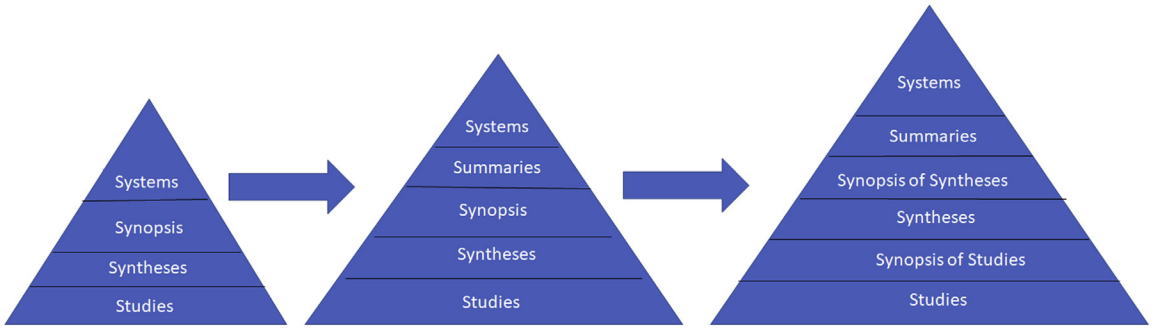

Figure 1. The growing evidence pyramid - from 4S to 6S.

exists in the workplace integrating EMR and CDSSs, the clinician need not go further down in the pyramid searching for evidence. Apart from all these, federated search engines with meta search capabilities allowing evidence search across all levels of the 6S pyramid exist such as TRIP, SumSearch and ACCESSSS. Such resources for locating evidence have evolved over the past few years and are now much quicker and more satisfying in the quest for answers, provided the proper question is asked.

So, why we should we turn our head away from these opportunities to help us plan treatment? As part of health-care system, orthodontics should try to utilize these to help provide patients with the best care available based upon solid scientific foundations. I really feel, it is time to revise and revive our tactics! Embrace the growing evidence-based pyramid and use it for patient care whenever possible. Your patients will reap the rewards of your practice decisions leading to years of smiling faces.

References

[1] de Groot M, van der Wouden JM, van Hell EA, Nieweg MB. Evidence-based practice for individuals or groups: let's make a difference. Perspect Med Educ 2013;2(4):216–21.
[2] Sackett DL. Rules of evidence and clinical recommendations on the use of antithrombotic agents. Chest 1989;95(2):2S–4S.
[3] Haynes RB. Of studies, syntheses, synopses, and systems: the "4S" evolution of services for finding current best evidence. Evid Based Med 2001;6(2):36–8.
[4] Haynes RB. Of studies, syntheses, synopses, summaries, and systems: the "5S" evolution of information services for evidence-based healthcare decisions. Evid Based Med 2006;11(6):162–4.
[5] DiCenso A, Bayley L. Haynes RB Accessing pre-appraised evidence: fine-tuning the 5S model into a 6S model. Evid Based Nurs 2009;12:99–101.

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