

# IMPLEMENTATION AND ASSESSMENT OF A STRUCTURED READING EDUCATION PROGRAM FOR TRAINEES

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## PLAN

Residents frequently enquire about a “reading list” prior to or during a rotation. Self-directed learning is a fundamental component of physician education. With an increased focus on flipped classroom based learning there is an increased need for learners to obtain factual information prior to interactive time with faculty. A similar paradigm, but on a larger scale, exists with fellows prior to starting their fellowship. As a developing and growing residency program, there is increased need for structured trainee learning that is not continuously dependent on faculty time. This has recently been highlighted by an internal departmental stated need to enhance resident educational programs. A structured reading program is one potential avenue to address this.

Specific to our interventional spine and musculoskeletal medicine rotation, we already have implemented a weekly one-hour long interactive teaching session between faculty members and rotating or otherwise interested trainees. This teaching session most often functions as a “flipped classroom”. However, without the pre-requisite knowledge to engage in discussion, this often results in faculty either conveying information that can be self-taught by trainees prior to lecture or leading a high-level discussion that is too advanced for many of the trainees present. This is also an area that a structured reading program can address.

Lastly our institution, similar to many other institutions, on boards new fellows every year. The early months of fellowship are often spent teaching fellows information that can otherwise be obtained via a structured reading program that could occur prior to or during the beginning of fellowship. A strong grasp of the landmark and fundamental literature in the field early on would allow for more mentorship and apprenticeship type learning for the majority of the fellowship year.

All of these issues have recently become more timely given the lack of in-person training and didactic sessions due to recent COVID-19 restrictions

## DO

Identify approximately twenty high impact manuscripts in the topic of interventional spine and musculoskeletal medicine. Recent or landmark articles will be identified. A brief “learning objective” will be identified for trainees pertinent to each article to help with the reading being more structured. A pre and post course quiz will be developed and administered to trainees to assess if participating in the structured reading program increased their fund of knowledge. Because of the volume of articles and goal of increasing basic knowledge, the estimated time period will be 8-12 weeks. Accordingly, the knowledge assessed on the test will be concept based not detail oriented.

## STUDY

Quantitively assess pre and post assessment scores

Potential to qualitatively assess faculty member engagement and satisfaction with the weekly 1 hour long flipped classroom teaching sessions to see if increased fund of knowledge amongst the trainees correlates with increased faculty engagement and satisfaction.

## ACT

Integrate structured reading assignments within the residency curriculum for other topics within PM&R

Apply similar project to other levels of trainees (ie. fellows or medical students)

Consider creating multiple “assignments” for the same topic (Interventional Spine and Musculoskeletal Medicine) for the same population (ie. have 3 assignments that are used on a rolling basis so each residency class does all three over their PHYII-PGY IV years)

## ASSIGNMENT

The structured reading education program was designed to educate learners on both factual and conceptual principles that are fundamental to providing evidence-based spine care. Reading materials were selected to represent sentinel articles, recent reviews, and timely topics. Neither the pre or post assessment scores were included as part of the residency evaluation process. It was meant to be a form of self-assessment. The assessment was been designed to assess learners understanding of the topics and readings. The reading program was set up into mini-sections. Each section has stated learning objectives that were to be viewed before reading the articles. This was designed to give learners a “goal” with respect to what they should be trying to get out of reading the assigned articles.

23 articles articles were selected and divided into 9 sections:  
Diagnosis of low back pain:  
Safety interventional spine procedures  
Epidural steroid injections:  
Miscellaneous procedures:  
Lumbar radiofrequency ablation:  
PRP and Stem Cell injections in the spine:  
Diagnostic discography:  
Ultrasound for sacroiliac joint injections:  
Diagnosis of Sacroiliac Joint Pain:

Below is an example of “guided” reading instructions (section on diagnosis of low back pain):

“Non-specific” low back pain is better described as “non-diagnosed” low back pain. The first overview article by DePalma should help you describe different causes of low back pain and how age affects the incidence of these at various points throughout life. The study by Levi is a good example of a study that validates a “test”, in this case taking a historical feature and comparing with another diagnostic test to validate it. You should be able to describe the clinical features of suspected discogenic pain after reading this article, and also describe why this paper is a valid measure of patient “history”.

## RESULTS

12 Trainees completed the reading program  
Average pre-test score was 12.7/25 (51%)  
Range of 6/25 - 20/25  
7 trainees have thus far completed the assignment  
Average pre-test score of these was also 12.7/25 (51%)  
Average post-test score was 21/25 (84%)  
Range of 17/25– 23/25  
Average Improvement was 8.4/25 (33%)  
This represents a relative increase of 66%  
Smallest improvement was from 17/25 to 20/25 (PGY 4 resident)  
Greatest improvement was 6/25 to 21/25  
This learner was a PGY II who also had the smallest time interval between pre-test and post-test and completed the learning assignment during the course of his spine/pain rotation

## DISCUSSION

Overall, the results clearly demonstrate that readers increased their fund of knowledge, with the average pre-test score of 51% which traditionally would be considered a very poor “test” score and an average post-test score of 84%.

The limited number of participants who have yet to complete the project limit generalizability of the findings. Of note however, there was a trend that more senior learners scored higher on the pre-test. This is positive in the sense that they are naturally obtaining some of this information during their clinically training. This may also suggest that this project is best suited for junior residents as a “preparation” leading up to their spine/pain rotation. The post scores were uniformly high (a PGY-IV had the lowest score (17/25) with all other score >20/25. This suggests that there is no “ceiling” in terms of understanding of the content for more junior level trainees.

Out of 18 potential trainees, only 12 have thus far completed the pre-test despite it being available for 6 months. This is somewhat disappointing on a number of fronts. Firstly, there was a stated demand from the residents to have more type of this content available to them and yet utilization was only 67%. This was initiated during the early months of COVID, during which many trainees had minimal clinical responsibilities initially. This learning project was also deemed “mandatory” by the residency program director, though a firm “due date” was not given. Potential means of increasing participation could be more authoritarian/punitive. Neutrally, it could be stated the results of the test would be part of residency evaluations during their respective spine/pain rotation. Conversely, the spine/pain faculty could take additional initiative in organizing time to discuss each sub-section of the material during the spine/pain rotation as a means of informally encouraging completion of the reading as well as re-enforcing the learned material.

In conclusion, this project does show promise that providing learners with a structured form of focused reading can be a means of facilitating self-directed learning. This is an extension of simply providing a “reading list” and in theory may provide learners with a more intentional method of obtaining new knowledge.

## FUTURE DIRECTIONS

This type of learning material can be extended to all rotations within our residency program. For this to be worthwhile, attention is likely needed to the issues discussed above to increase learner utilization and participation. There are also plans to disseminate this or a similar project nationally to all fellows who are participating in the new NASS Interventional Spine and Musculoskeletal Medicine Fellowship Program. For the latter, an extension of this would be to expand this material to include additional articles for the respective topics and to be more comprehensive for additional topics pertinent to interventional spine and musculoskeletal medicine. In that vein, it could serve as a foundation for a year-long curriculum.

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