

Get the Lead off Our Backs!



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Many interventionalists face physical challenges almost daily for years or decades. The burden of assuming awkward positions while carrying extra weight can take its toll on the musculoskeletal system to such an extent that the career is ended or modified to exclude procedural aspects. The proliferation of lighter aprons has unfortunately resulted in reduced protection with poor correlation of protection to labeling due to the inadequacies of testing methods for nonlead materials. The protective quality of the non-leads is not superior to lead-containing composites on a weight basis, and the user no longer knows how well they are protected unless buying aprons containing lead. Various useful methods and shields that may reduce radiation exposure are supported by the floor, ceiling, table, or patient. The suspended personal radiation protection system is a recent development which provides substantially greater radiation protection than conventional lead aprons combined with other shields, while also taking all of the weight off of the operator. It is composed of an expansive and thick (1 mm Pb equiv) apron with a large face-shield to protect the neck, head, and eyes, and is suspended overhead to provide motion in the x, y, and z planes. Exposures may also be substantially reduced by leaving the area during acquisition sequences and use of power injectors.

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Introduction

The combination of heavy garments and suboptimal ergonomics can lead to onset or exacerbation of already common maladies of the spine and other joints which are annoying at best, and career-ending at worst. Lead or non-lead aprons only work well when they are heavy, and interventionalists require the highest level of protection because they work for long hours in the “hot spot.” The laws of physics have stalled the search for lighter, effective garments at an approximate 20% weight reduction compared to pure lead when carefully compared. Many types of nonoperator supported shielding should be used to help reduce exposure, but they do not get the lead off our backs. Overhead suspended personal radiation protection systems (SPRPS) eliminate the standard lead apron, taking the weight off while providing greater attenuations and wider coverage. Robots are entering the field with complex implications for exposure.

Hard Work

Many interventionalists spend more time in lead as high-complexity procedures continue to develop, and subspecialization leads to more time in the lab. Scatter doses are getting supersized as the worldwide obesity epidemic marches on. Operator exposure increases 8.4-fold when patient thickness increases from 24-34 cm¹, sometimes overwhelming the benefits of imaging chain improvements and manipulations. The need for solid radiation protection and ergonomic improvement grows for many interventionalists.

Interventional Practice Vs Musculoskeletal System

There have been many societal position statements and opinion leaders crying out about the ravages of the interventional environment on our bodies, and most interventionalists personally know a colleague who is affected, but is there any real evidence? Several studies have examined this question. Ross et al² coined the term “interventionalist’s disc disease” when discussing the results of their survey (N = 714) comparing interventional cardiologists (doing many procedures in aprons) to orthopedic surgeons (doing many procedures but fewer in

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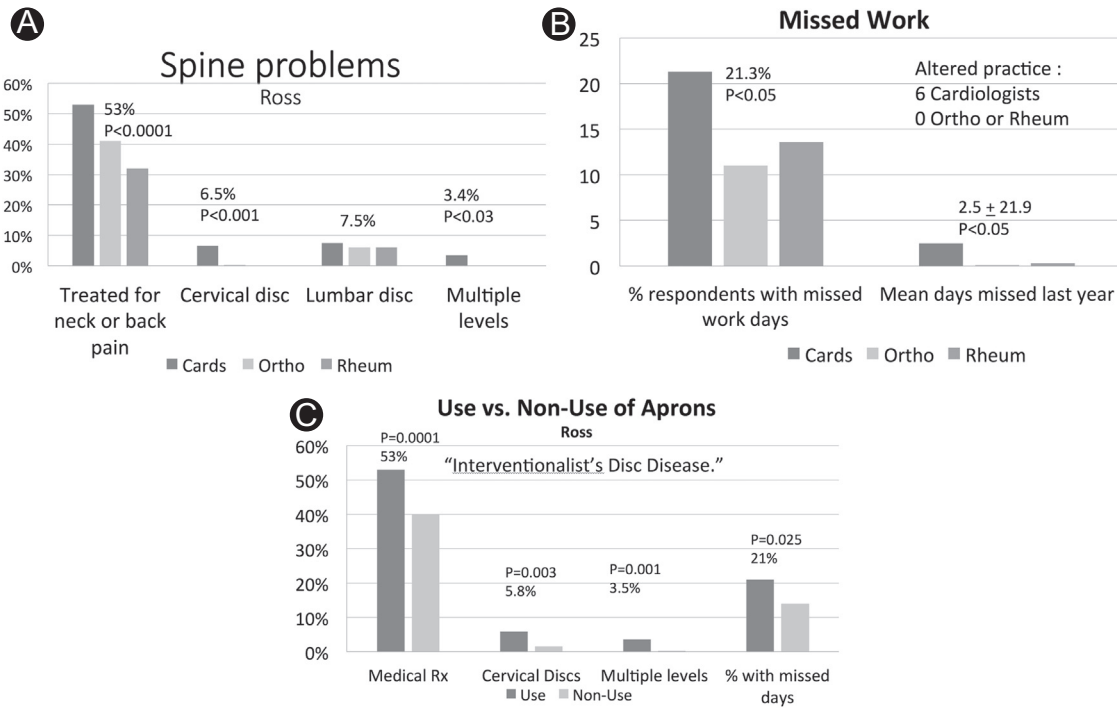


Figure 1 Interventional cardiologists were more often treated for spine pain, were much more likely to herniate a cervical disc, and were the only group to experience multilevel disease (A). Interventional cardiologists missed more days of work and were more likely to alter their practices (terminate performance of procedures) due to spine disease (B). Compared to nonusers of aprons, apron users were more often treated for spine disease, were more likely to herniate a cervical disc or experience multilevel disease, and missed more days of work due to back pain or sciatica (C).

aprons) and rheumatologists (doing few procedures). Interventional cardiologists had significantly more problems in several categories including treatment for back or neck pain (53%), and a much higher incidence of herniated cervical discs (6.5%) (Fig. 1A). Significantly more interventionalists missed work due to back pain or sciatica, with a significantly greater number of days missed, whereas 6 interventionalists had their careers cut short or limited; none of the controls experienced this financial setback (Fig. 1B). When comparing those using aprons vs those who do not, similar problems were more prevalent for apron users (Fig. 1C).

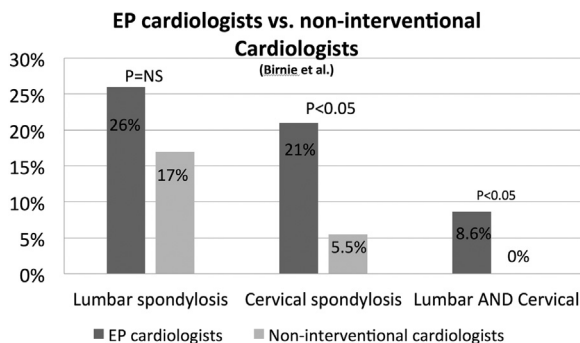


Figure 2 EP cardiologists had more spine problems than non-interventional cardiologists and were the only group to include physicians with both lumbar and cervical diseases.

A survey of the 12 largest EP labs in Canada had a high response rate, a well-matched control group of noninterventional cardiologists, and the fortuitous absence of spondylosis in the EP group prior to practicing EP.³ This study showed more lumbar disease and significantly more cervical disease (21% vs 5.5%) for those in the interventional environment vs those who were not (Fig. 2). Significant differences in years of practice and age were found for EP affected vs EP unaffected, with general landmarks at 50 years of age and 20 years in practice (Table 1). Cervical disease came with high morbidity. Of the 12 EPs who developed it, 10 got radiculopathy, the duration was long at a mean of 2 years, and 7 could not wear lead for a mean of 10 weeks. All eventually returned to work; however, it is not clear if there were others not returning to work who would have never received the survey in the first place since it was distributed to active practitioners.

Table 1 Age and years-in-practice were associated with higher prevalence of spine problems

Affected vs Unaffected: Significant differences			
	EP Affected— Lumbar	EP Nonaffected— Lumbar	P
Number	15 (26%)	43 (74%)	
Years in EP	20 ± 10	13 ± 9	< 0.05
Age	51	44	< 0.05

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