

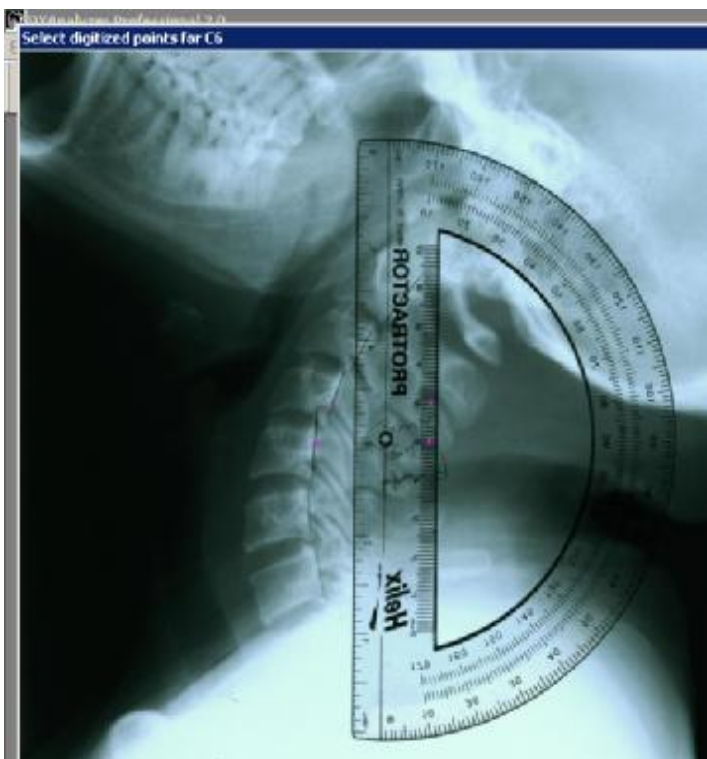
Hand Mensuration Cannot Approach the Accuracy of Computer Assisted X-Ray Digitization Performed By a Trained or Certified Doctor

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There is the idea out there that you can measure your own x-rays in clinic for ratable ligament damage, i.e. a qualification of the Category IV “Alteration Motion Segment Integrity” in the AMA Guides. This of course would mean that you would be measuring them by hand.

As one who has practiced as a Certified Pettibon Practitioner, I can tell you that there is a place for hand mensuration in your x-ray work ups, as many techniques use accurately, hand mensuration for their technique and their outcome assessments. The accuracy of hand mensuration for these purposes is fine, and well documented as accurate enough.

The accuracy of hand mensuration is not adequate for qualification of impairment rating as most of you do not have x-ray rulers that show tenths of a millimeter. This paper is to show you why, when you are trying to establish ratable impairment due to spinal trauma, you must use computer assisted digitization. I will only go into enough detail to make my point and will write further on this at another time. The fact that you do not have a ruler with tenths of a millimeter delineated on it was enough for most of you, but here are some visuals for you skeptics, which in my opinion our profession is laced with.



Now what I am going to show you first is what your x-rays look like on your view box with your standard protractor or ruler. Then I am going to show you what they look like once in the computer and give you just a couple of things that we can do to improve the accuracy of your images. I have purposely placed the lines on the x-ray to exaggerate the translation so please do not get stuck on the point placement as this is a training example on accuracy not on point placement. Again I AM PURPOSLEY EXAGGERATING THE TRANSALATION in this example!

This is very close to real size for you and what you would see on your view box with your ruler and marking pencil. Again do not get suck on the points as I am exaggerating the translation. Behind the ruler you will see I have listed a 3 mm translation of C4 on C5.



This looks about right doesn't it! Again you may disagree with the line placement which is okay because it is exaggerated by design, however I do not think you would find the thickness of the lines to be unusual would you? Now observe the dots on the lines on both the x-ray and the dots on the lines of the ruler. See one dot for each line? That is what you would see on your view box...one dot per line. A computer assisted digitization system is like having a microscope that allows you to zoom in on the x-ray for accuracy, which I will now show you as there are actually two dots per dot on each of those lines! The two dots there are used to mark the width of the line, however you still see it as only one dot in this view (your view on your view box).



Now if you are dealing in tenths of a millimeter as significant in impairment rating, i.e., 3.51 mm of translation qualifies for a impairment rating level, then obviously we must have a more sophisticated system to measure our translation and angulations.

Now observe in each line there are two dots indicating the width of each line, and I think we can agree that we have at least 0.75 of a millimeter of line width with each line, and remember we agreed that when we were zoomed out that it was standard line width that we would see on our view boxes. Now you tell me how this works by hand mensuration because in order to assess translations we are measuring both in flexion and extension which means four lines total per measurement and if we can agree that we have .75 of a millimeter per line we have 3 mm of line not to mention the width of the line on the ruler that we have to contend with as it has width as well.

Here is another fact all of the normals for spinal displacements as well as the abnormal were determined through research and they NEVER HAND MEASURED the films, they, the researchers always used more accurate computerized digitizing systems to generate the numbers. This is also true of the numbers used in the AMA Guides.



So you tell me is that a 3 mm translation or a 4 mm translation. I do not care if you tell me you are the highest Board Certified Medical Radiologist in the country, or the best DACBR in the country, or the best field doctor in the country, you cannot accurately measure that by hand, and to say that you can shows there is zero credibility in your statement once I put up these images up and you or anybody else sees the truth. You cannot accurately hand measure this. Our system uses optical technology to measure the pixel space by pixel. My dot on the x-ray in my software is 0.0023 mm wide and when I have four lines with my system I have about 0.01 width of lines not 3 millimeters!!!!

There should be no doubt in your minds now why you have your films digitized if you want accurate measurements on your findings.

Now like each topic we have covered there is a lot that is not readily apparent until one really looks at something and simplifies it. There are a number of x-ray digitization services,

However they are not all alike, and none of them are using software this sophisticated in my opinion. Some of them are using people with no back ground in medicine, chiropractic or even anatomy to perform the studies. In one case a \$10.00 per hour secretary staff off of the street was going to be performing the studies, which of course can be justified by the idea that another who is trained, a doctor is going to sign off on the report. Doctors there is a technique to point placement that requires a full conceptual understanding of functional radiology, which is impossible for these lay people to have and can lead to major inaccuracies in the studies. The point placement is the most important aspect of the study, so know who is performing yours!

My advice to you if we are not doing your studies is that you always find out who is doing your studies and what is their background. If you have any questions call or e-mail me at info@nationalinjurydiagnostics.com.

I hope this presentation puts to bed for you the idea of hand mensuration vs. computer assisted mensuration for accuracy.