

K

I thought i would put this to group.  
What is the best way to record CR?  
My methods are

1. bimanual manipulation - mixed results.
2. leaf guage - i tend to use this majority of the time. asking the patient to slide forward and then back and bite. use futar d or bite mouse
3. lucia jig - time consuming

I have on a few occasions made a splint, but find it very difficult to sell them to the patient for diagnostic means.

What are everyone's methods?

A

Good question and I guess Raj will also contribute to this. Mike Wise wrote an amazing series of articles in 1982 which I think are still good. He categorised patients according to difficulty of manipulation. Easy cases = bimanual manipulation, medium cases = tongue spatula, hard cases = lucia jig or stabilisation splint. Stephen Davies in his BDJ series in 2001 says more or less the same thing but refines it down to easy = manipulation, hard = stabilisation splint. In effect the stabilisation splint is used as a "training appliance" to get the patient to reliably go into centric relation.

The leaf gauge is new to me. I heard about it for the first time only about a year ago and have no experience of using it. However it seems useful and perhaps it might fit into the medium difficulty category. I use bimanual manipulation wherever possible because it is fast and easy for the right patient. Having said that, in my determination to get a CR recording in one session I have had patients biting on cotton wool rolls etc for up to an hour in order to try to reprogramme their muscles and get a recording there and then.

I guess the key to taking money off people to make a stabilization splint is to explain the importance of it. I sometimes tell patients "You will be able to find a dentist who will do this more quickly and more cheaply than me" I then explain why that might not be a good idea and leave them to make their own mind up. It usually does the trick.

How you make a record so that you can transfer centric relation to the articulator is a different matter. Techniques that I know are the beauty wax technique, the duralay technique and the greenstick/silicone bite reg technique. Again wherever possible I use Stephen Davies' greenstick/silicone bite reg technique because it is fast and easy.

I have posted some of the references that I have referred to on our study group page.

I will be interested in Raj's approach to these questions.

R

I use all the techniques described.

The bite splint per se is not for necessarily finding CR, rather it helps discover / determine /define a restorative position and to pre-test or discover determine / define your guidance and the effects it will have on the musculature.

As the basic splint is manufactured on an articulator (preferably) you have to have a starting point to mount the models so some attempt at finding 'CR' or thereabouts is useful.

Bimanual manipulation I find to be the most unreliable quite frankly.

I prefer a simple anterior deprogrammer (lucia jig is just one o these of a specific design, but essentially they are all the same), however a leaf gauge is a simple

technique too...as Kal described, have them slide back and forth on it, If it induces a spasm of the pterygoids have the patient clench hard in the posterior five times on cotton rolls and try again, it usually does the trick of releasing the muscles. When this happens all the other condyle/ramus attached muscles will pull the mandible up into CR as they slide back on the leaf gauge.

Remove leaves one at a time until they feel first point of contact and take a bite reg at this position.

For the deprogrammer technique, have a bit of bite reg in it to secure it to the anterior teeth, have the patient arc into it, draw a pencil line across the lower anteriors where they touch it. Have them hang open 30secs then arc onto it again, mark the position, slowly slowly without posterior contact the pterygoids will release and the mandible be drawn back and up into Cr by the other muscles, masseters and temporalis and eventually they will keep repeating the same position of contact, bite reg at this arc of closure....on a non terminal hinge axis face bow record of the upper cast to the articulator this slightly opened bite registration will have a slightly greater error, but if you ask Frank Spear he says it's totally negligible given the fine tuning equilibration you'll inevitably have to do on every case anyway, for which he uses a leaf gauge by the way.

A

Raj thanks for the informative reply. Could I clarify a couple of things ?

*The bite splint per se is not for necessarily finding CR, rather it helps discover / determine /define a restorative position and to pre-test or discover determine / define your guidance and the effects it will have on the musculature*

I think I understand what you mean. We are not finding CR for the sake of it but to establish the restorative position. However, unless there is a displaced disc, the position will always be CR won't it ? Also perhaps you could say a bit more about how the splint defines the guidance and the effect on the musculature. With a splint in place the vertical dimension is increased by virtue of having a load of acrylic between the teeth. Therefore this doesn't represent the final restorative position unless we are going to restore all the teeth to this new vertical dimension. How can we then draw conclusions about guidance and the effect on the musculature if the final restorative position is going to be at a different vertical dimension ? Perhaps you mean that this is assumed to be close enough because it will be on the same arc of closure in CR. What do you think ?

*on a non terminal hinge axis face bow record of the upper cast to the articulator this slightly opened bite registration will have a slightly greater error*

Didn't quite understand what you meant here. Did you mean if you mount the casts without a facebow ? Is Spear saying that the error is going to be so small that the facebow is not necessary because there will be some final refinement of the occlusion anyway?

R

Yep to the first conclusions of my very brief iPhone single finger tapped reply.

Nope to the second conclusion.

The earbow registration mounts the upper cast at an average position based on an assumption that 90% or so of adults have a certain relationship of earhole to centre of a cr positioned condyle axis of rotation. Whereas a terminal hinge axis positioned facebow attempts to locate the centre of the axis of rotation of the condyle in cr, according to Spear neither is accurate so both have error when mounting casts on an articulator, further errors are inherent in the casts, the imps, any restorations, the

mounted equilibration, the fitting of restorations etc so you'll have to do a final equilibration anyway. Higson insists on using term hinge axis facebow recordings . Spear says the error in earbow is negligible. Both insist on using articulators for any restorative case, even a single crown... I happen to agree.

Guidance in a restorative case could be examined and guesstimated from the wear on existing teeth, if there are none how to determine what will suit the patient could be trialed in plastic with a tanner or Michigan type splint rather than a flat plane splint, as you have the incisal guidance ramp angle built into the anterior part of the splint, if it is too steep the patient will grind into it and you will see it, plus they will report tender muscles, shallowing until they feel freedom will help to determine what their restorations should look like in terms of guidance, yes it will be built at a slightly open position but suppose its a wear case, maybe you will be restoring vertical dimension anyway, at least your restorative arc of closure will also be tested and determined, once you've tested in rotable acrylic you could then duplicate your intended position and guidance in composite to test function stability comfort and speech prior to accurate duplication in ceramics

K

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So by my understanding you always have to do a final equilibration, as we are using a semi adjustable, using a facebow, and only getting a cr and protrusive bite. This is true. But wouldnt one way to avoid this and make sure the restorations fit bang on, would be to locate the terminal hinge axis by tatooning, use a fully adjustable articulator and use a pantograph(i.e cadiax).

R

Yeah but only if you are accurate with your manipulation to cr, your tattoo, holding the face bow on them, your restorations, your seating etc. You could also use a custom ant. guidance table jig from articulated preop models In the end there will always be some error so "keep it simple" quote Frank Spear.

A

This is a very interesting discussion isn't it? So I think I understand now what Spear is saying. He compares two types of articulator. The first is the earbow type like a Denar in which the hinge axis is assumed to be 10mm in front of the ear 'ole. The second is the type where an attempt is made to find the actual centre of rotation. He then goes on to say that the difference is negligible especially in the context of the final refinement which is always necessary in the mouth

Kal has suggested that by using a fully adjustable articulator and pantograph these difficulties would be overcome and a perfect result could be achieved without the necessity for final refinement in the mouth. I don't think this is the case because there are inherent inaccuracies in all mounted casts even on the fully adjustables. In this context I don't think that in the vast majority of cases there would be any added benefit to using them.

Off the top of my head this is a list of inherent inaccuracies in all mounted casts on articulators. We could probably add substantially to these:

Casts - always inaccurate, very difficult to avoid some kind of distortion even with rigid special trays. In addition the mandible bends slightly on opening. You can't take an impression with the teeth together so the shape of the mandible that you record is different from the one when the teeth are together. In addition you have all the problems of setting expansion of the model stone, uneven layers of impression material, cusp tips touching the trays, uneven mixes etc etc. After all that we have teeth rigidly fixed on a model but bouncing up and down on a perio membrane in the mouth.

Articulators - There is no squashy interarticular disc, the articular eminence is irregular and squashy in the mouth but smooth, polished and rigid on the artic. Same for the medial wall. Same for the head of the condyle. The mandible also bends in function. Assessing the centre of rotation of a biological squashy system cannot be accurate.

All that is just for starters. Articulators are the best we have but are really nothing like a patient's head. That being the case I would question what the added benefit is of using a fully adjustable for most cases. It has been suggested that they should be used when there is a significant immediate side shift. However you wouldn't know that unless you had used a fully adjustable so there is a Catch 22 there. Also once casts are mounted on a fully adjustable they are there for the duration of the job. You can't swap them around like you can with a Denar so it's a logistical nightmare.

K

All the earbow really does is help us get closer to the hinge of the arc of closure, and bring our final occlusion closer to the live patient. But consider the error in impression materials, and the subsequent movement of teeth and the best we can hope for is "getting closer" not exact, as Andrew said. I believe in using articulators, but you will always require adjustments.

What I feel is that won't we get more accuracy by using a Cadiac and fully adjustable articulator, EVEN WITH THE OTHER UNAVOIDABLE INACCURACIES. It is a possible tool which enables the dentist to obtain better utilization of his lab

personnel. By effective occlusal instrumentation, this will enable the dentist to translate lab time to chair time savings. The ultimate goal is to do better dentistry, in less time.

Do i use a cadiax and fully adjustable? No. I use a semi adjustable. But I always have to adjust the restorations. Will i ever use a fully adjustable and cadiax, probably not ( i have only used it once and was very impressed though).

But I totally agree with raj , KEEP IT SIMPLE!!!

A

Thanks for the reply Kal, I guess you have hit on another important point there. Your technician need to know how to use it all too ! I guess the proof would be to take a number of cases and randomly assign them to the semi adjustable or the fully adjustable group. At the time of fitting, the degree of adjustment is assessed and then we would know whether it was a worthwhile exercise. I very much suspect that we wouldn't see any difference given all the other potential errors. I wonder if anyone has ever done that study? It's probably worth a look on medline.