MY TRIBUTE TO RICHARD DEAN 1944 – 2024   by Noel Stimson

Richard Dean's recent passing brought up so many memories for me that I started thinking about our earlier interests in TMD in the 1990s.

When I first studied occlusion in the early 1980s, some 10 years before I met Richard, we were taught by the LD Pankey organisation that there were two types of occlusion; one was based in the teeth (centric occlusion or CO) and the other was based in the TM joints (centric relation or CR – the 'hinge axis' concept). There was a difference of opinion as to whether or not they should coincide. Some said it was essential for a functional gnathological system, others claimed it was irrelevant in a majority of cases.

But Dawson (1) states in 1974:
"Centric relation is the starting point of occlusion".

Then I met Richard Dean.

He introduced us the whole temporomandibular concept, which was at that time being thrown into confusion and debate when engineering student Casey Guzay was tasked by his tutor to establish the centre of rotation of the mandible, using mechanical principles.

Guzay came up with the centre of rotation of the mandible being at the dens between C1 and C2! (Image below). If true, this means that during opening, the condyle can only translate forwards, and there was no possibility of rotation. Guzay's book (The Quadrant Theorem) was published in 1979 (3), a complete cointradiction to earlier understanding and beliefs.

Also, it became apparent that the TM joint is not a normal joint. It is a secondary or reactionary joint with a remote centre of rotation some 50mm 'to the south' of the joint itself. Indianapolis dentist Dr Timothy Adams DDS, described the movement as a 'Class 1 lever system'. (3)

This revelation put the entire concept of a 'hinge axis' at the TM joint into serious doubt. But it also explains the intricate connections between the gnathological system and head/body posture.
What puzzles me is that while centric relation (CR), whether a hinge axis or not, has been defined as a certain point within the gnathologic system. My understanding is that its relevance only exists for that tiny moment when the teeth are in contact (CO), whether they be coincident with one another or not.

In between those moments, the 7mm A-P diameter condyle floats around in an 11mm diameter glenoid fossa, the apparent void being taken up by the meniscus and the specialised synovial fluid. But the condyle simply hangs there 'in neutral'

most of the time, supported by the capsular ligaments and the resting masticatory muscles.

The word 'floating' suggests to me a potential for condylar movement, though maybe more than the usual antero/posterior sliding movement of mandibular opening and closing.
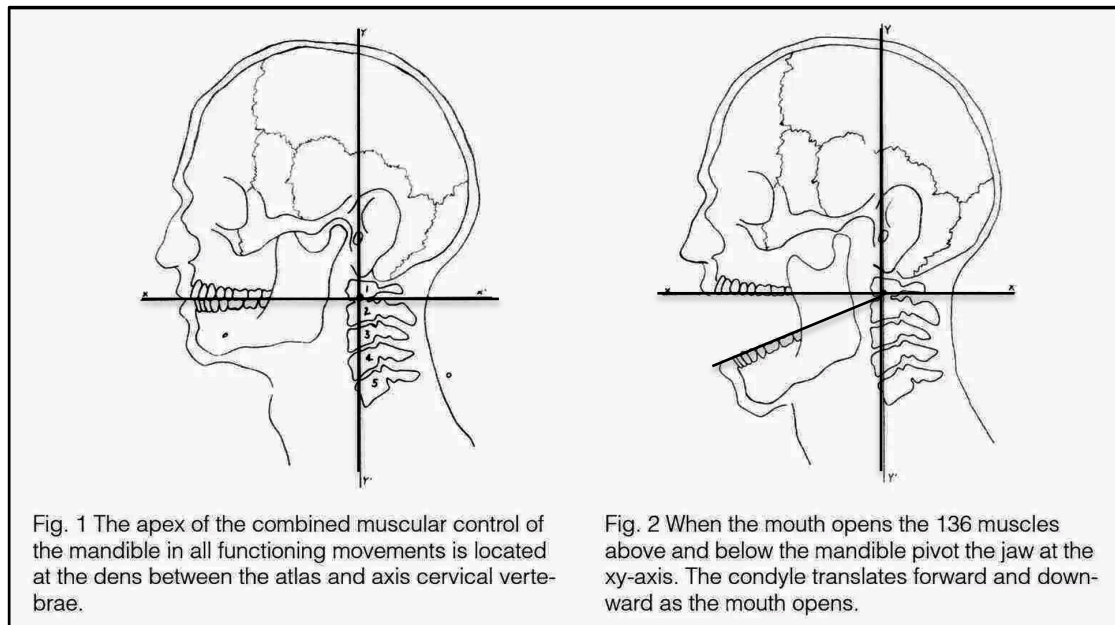
When we flex our head downwards onto the chest, only the anterior teeth contact; when we tilt our backwards, only the posterior teeth contact. The same happens when we tilt our head to left or right. This suggests to me that centric relation is a very mobile fleeting concept, and I wonder why we got so involved and fascinated by it all those years ago.

We now understand that Dawson's statement "*Centric relation is the starting point of occlusion*" was prophetic as well as concise; today most of us regard the archaic term CR as the space within which the TM joints function normally, a situation without which any surgical, functional or orthodontic work is pointless. Indeed, such thoughtless treatment could be regarded as iatrogenic due to the risk of committing the patient to a lifetime of pain and discomfort.

So, who was it who brought all this information out into the daylight for so many dentists, orthodontists, osteopaths, chiropractors and so many others? Who was it who brought such a collection of wonderful clear-thinking world class teachers to our shores? Not just for TMD but for head and body posture, modern orthopaedic and orthodontic thinking?

Richard Dean, we thank you.

Fig. 1 The apex of the combined muscular control of the mandible in all functioning movements is located at the dens between the atlas and axis cervical vertebrae.

Fig. 2 When the mouth opens the 136 muscles above and below the mandible pivot the jaw at the xy-axis. The condyle translates forward and downward as the mouth opens.

Casey Guzay's Quadrant Theorem 1979

References:

1. Peter E Dawson. "Evaluation, diagnosis and treatment of occlusal problems". Chapter 4, Centric relation, p 48. Mosby, 1974.
2. Casey M Guzay. "The Quadrant Theorem". Book published 1979.
3. Dr Timothy Adams DDS. (Website).