

# C-SHAPED MOLARS

C-shaped molars get their name due to their close resemblance to the alphabet 'C' in cross section (Fig.1). They have one of the most unique root canal anatomies with a high incidence of hidden, un-reachable areas, lateral canals, fins & apical deltas & anastomosis.

California has probably one of the highest populations of Asian descent compared to the rest of the country. I thought this would be an interesting topic for this edition of GreenRoot News due to high incidence of this anatomy in this particular ethnicity. As Californian Dentists, we stumble upon these c-shapes quite often than the rest.

This newsletter outlines the interesting facts & clinical challenges of these anatomies & present a recent case performed in our office.

I hope you enjoy reading about them.

**-Ramya**

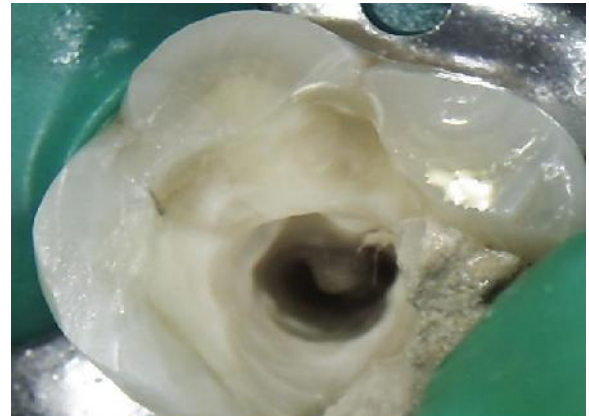


Fig 1: 'C' shaped root canal anatomy

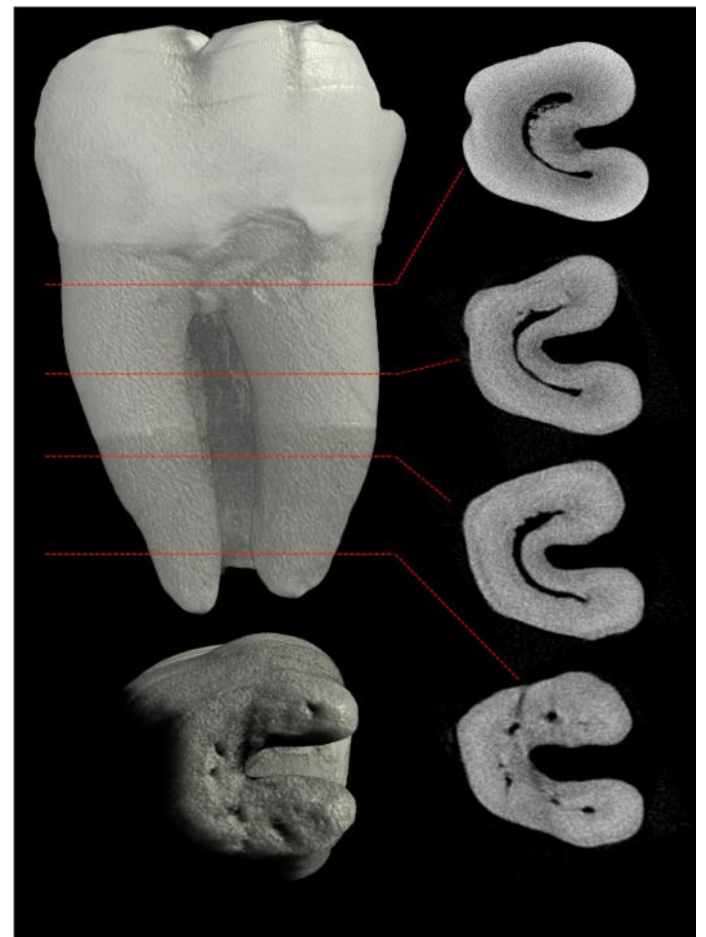


Fig. 2: An example of variation in the C- Shaped Molar anatomy at different cross-sections of the root Source: <http://rootcanalanatomy.blogspot.com/2011/10/maxillary-second-molar.html>

## Interesting Facts:

- Most common in Mandibular Second Molars
- Most common in Chinese population (31.5%) & mixed Asian population (13%). Most common in women.
- Radiographically, these teeth in general have fused conical roots or sometimes there is a vague separation of roots.
- The canal shape can vary along the length of the root & therefore the appearance of the canal orifice may not be good predictors of the actual canal anatomy (Fig. 2).
- The pulp chamber is usually situated deeply. Orifices can be located almost 3 mm below CEJ & should be taken into account while opening an access

## Clinical Significance:

C-shaped canals can present significant challenges in debridement, obturation, and restoration. Root canal therapy on these teeth generally has a lower rate of success, and patients should be advised of this before treatment begins. Studies have shown large amount of uninstrumented canal space & debri in histological sections. This is due to the fact that the unreachable areas in the anatomy house soft tissue remnants or infected debri that escape thorough mechanical cleaning & filling. It is hence important to focus on chemical disinfection methods like copious irrigation with sonic or ultrasonic activation & Calcium Hydroxide as intracanal medicament to obtain adequate disinfection.

Canals are generally closer to furcation making them highly susceptible for strip perforation either during cleaning & shaping or post placement. Large posts or greater taper canal preparations should be avoided. Warm vertical condensation technique is considered better for obturation of these canals to obtain a dense three-dimensional fill.

## Case: Initial RCT tooth #31

An Asian female presented to our office with symptoms of irreversible pulpitis. A c-shaped anatomy was suspected based on the pre-operative two-dimensional radiographs (Fig.3). CBCT was taken confirm the c-shaped anatomy & obtain further information on the variation in the canal anatomy at different cross sections of the root.

It was noticed that #31 had a single canal in coronal third which split into multiple anastomosis in the middle third followed by a single canal again in the apical third (Fig. 4). Patient was informed in detail about the anatomical complexities involved with the procedure before the treatment was initiated.

The anastomosis in the middle third was a significant challenge to clean mechanically with hand or rotary files. I had to completely rely on the chemical disinfection methods & sonic vibration to clean the middle third of the canal. Even though the pulp was vital, the RCT was completed in two visits with Calcium Hydroxide as interim dressing to further aid in chemical disinfection of canal space & increase the chance of long-term success of the treatment.

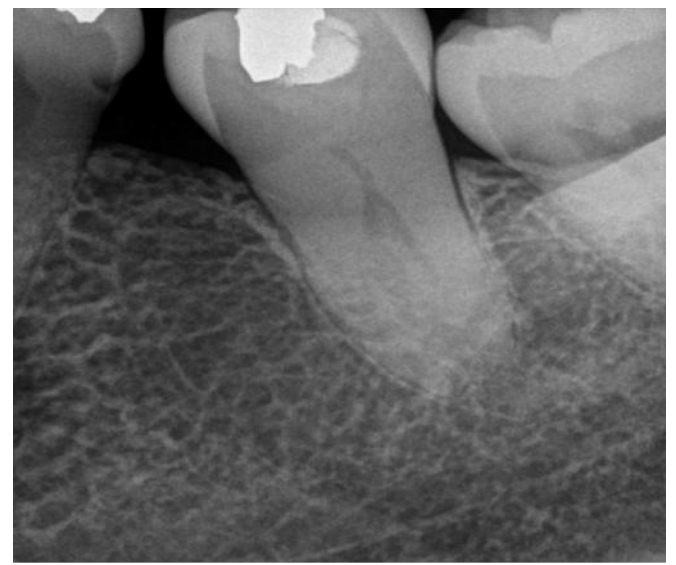


Fig 3: Pre-op PA hinting a complex canal anatomy. Note the deeply situated pulp chamber.

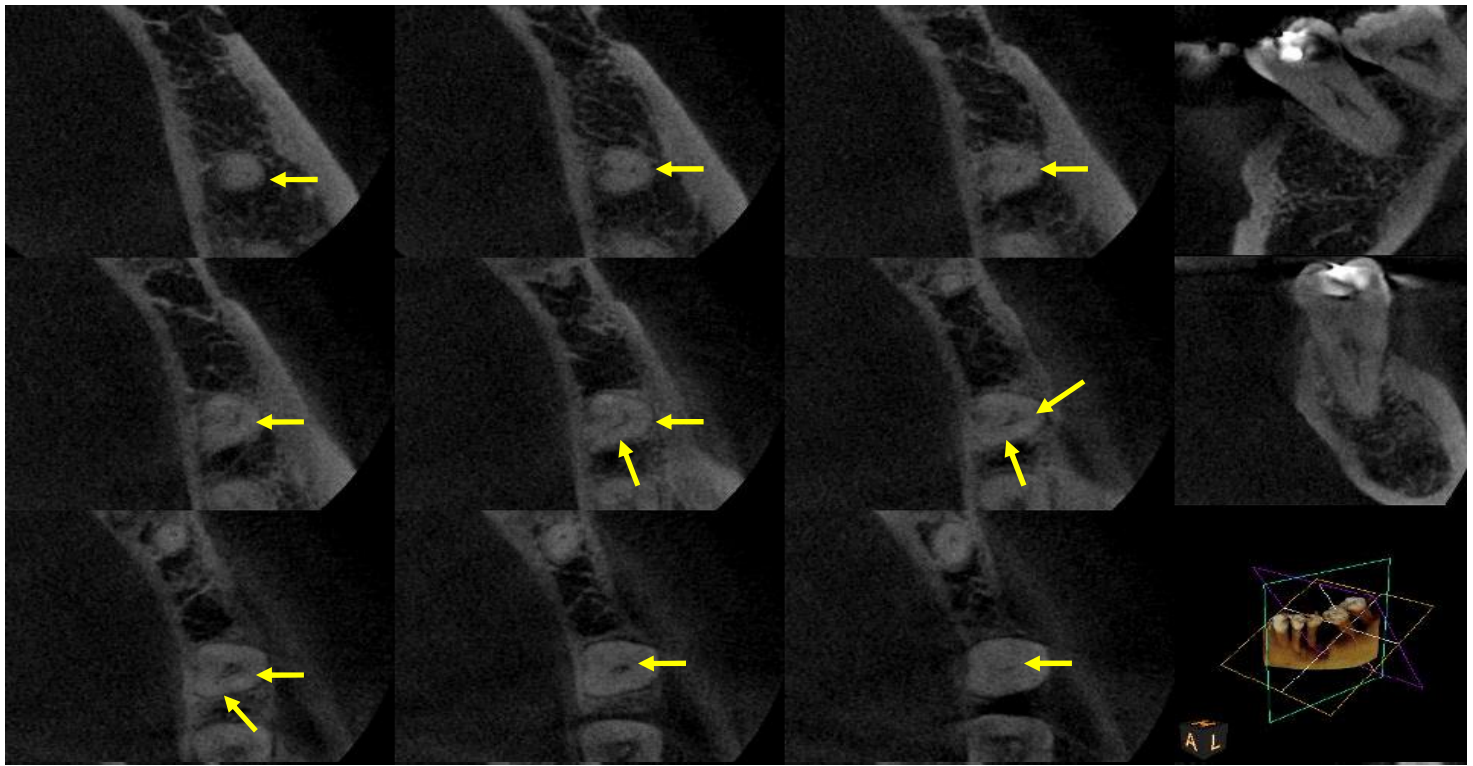


Fig. 4: CBCT axial slices showing varying anatomy at different cross sections of the root.

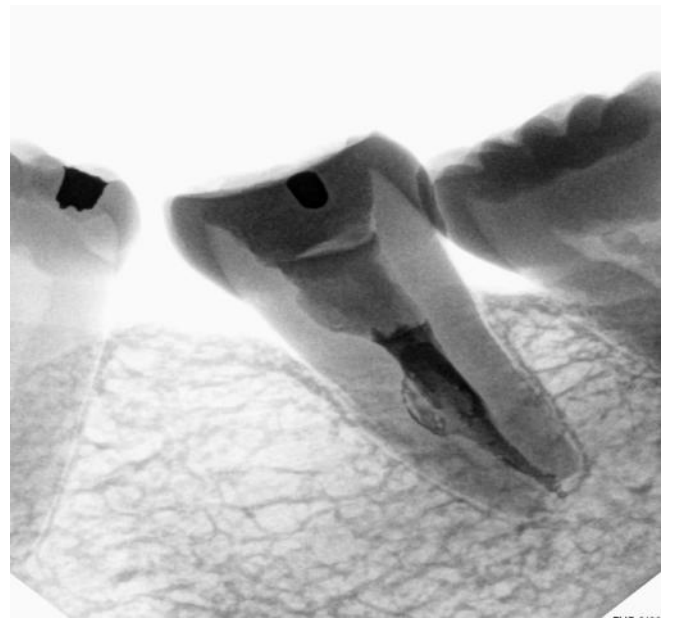


Fig. 5: Post-op. Fig. 6: Post op. Invert view. Note the extensive lateral anastomosis in the middle third of the root.



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