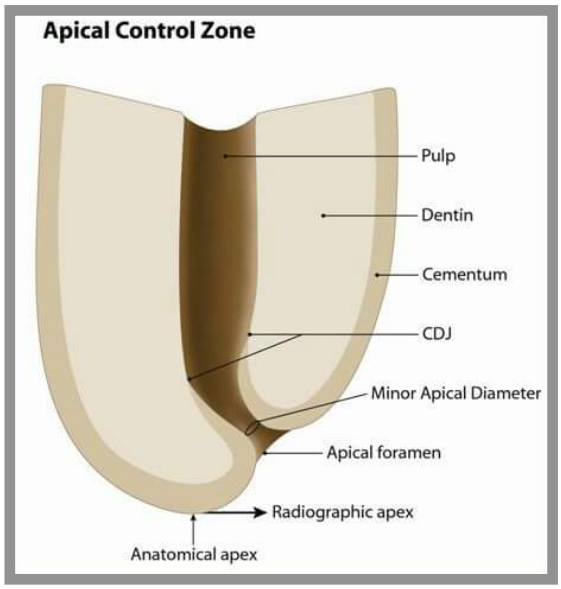
Apex locators

There are many apex locators on the market. Price and build quality can vary but there is extensive literature confirming that they are generally very accurate at their 'zero' reading.

What do they actually measure at the 'zero' point?

It is the point at which the tip of the file touches the periodontal ligament or the canal terminus. Remember this is different from the radiographic apex, anatomical apex, minor apical diameter (apical constriction) or apical foramen.



How accurate are they?

They are the most accurate method of length determination. The 'zero' point is the only accurate measure on the scale **but** they are not infallible.

What about the scale leading up to the 'zero'?

This is not calibrated so can not be relied on. To be sure of a consistent, repeatable 'zero', go past with the file and withdraw it back to the 'zero' point.

Why don't they work 100% of the time?

Detailed below are several reasons they may not be 100% reliable. Review the troubleshooting steps at the end if you are having problems.

Avoid working through metallic restorations or caries

Trying to work through caries or a recently removed metallic restoration can upset electrical conduction. Remove caries and metallic restorations before placing rubber dam or consider replacing the rubber dam sheet before accessing the canals as it eliminates the possibility of conduction from the debris.

Avoid working through leaking restorations or caries

Open or leaking cavity margins especially if they extend subgingivally will often cause inaccurate readings. Remove caries and leaking restorations and place a well-sealing provisional restoration before placing the rubber dam to prevent this problem.

If you prefer to leave the rubber dam on, once the restoration and caries have been removed, decontaminate the rubber dam tooth with an isopropyl alcohol or sodium hypochlorite-soaked cotton pellet ensuring all fragments are removed. An additional caulking (sealing) agent should then be used before the disinfection process e.g. Rubber Dam Liquid®, Opaldam® or OraSeal®

Dry the access cavity and canal

Throughout the process of chemomechanical debridement of the root canal system, the access cavity should be fluid-filled. Most of the time this should be sodium sodium hypochlorite however the penultimate rinse might be 17% EDTA solution. The only times the access cavity should be empty are if you are visualising something such as a canal orifice or the pulp chamber floor, if you are checking your working length with an apex locator or immediately prior to obturation.

To dry the canal enough for the apex locator reading, instead of using several paper points, simply aspirating the solution form the canal - go as far as you can apically with the needle (do not engage the tip) and aspirate. Incidentally this aspiration followed by irrigation and repeating is an excellent way of dynamic irrigation of the root canal system.

Choose a larger file

The file should ideally touch the sides of the canal so if a 10 file doesn't, try a 15 or a 20. In larger canals, you may need to go to a much larger file - you could even use your niti rotary file in your fingers to see if this gives a better reading. If the niti file is in the handpiece, remember the file clip or touch probe of the apex locator only needs to touch metal so could simply touch the handpiece instead of trying to reach round for the file.

Ensure the file is not touching the access cavity walls

Check carefully that the file is not touching the walls of the access cavity - hold it away from the clean access cavity walls especially when near the working length.

Check battery power

Several devices range in accuracy at different battery power levels but most work well on full or nearly-full levels. Check the gauge and replace the batteries to see if it will make a difference.

Clean electrical contacts

Check the points at which the file clip or touch probe contacts the file and where the lip hook touches the lip.

These components should be autoclaved between patients but the file clips remains retracted at rest so when decontaminating, unless exposed manually, the contact does not get cleaned. The same applies during autoclaving - ensure the file clip is exposed when cleaning to prevent this.

If not specifically cleaned for some time, expose the contact and use something like Brasso® or perhaps a 'fine' Soflex® disc to clean the it throughly then autoclave it.

Replace cable, clips and probes

Remember replacement clips, probes, lip hooks and main cables are all available independently so you can simply replace them with new ones without getting a whole new apex locator.

If all else fails

It is unlikely but you could have a faulty apex locator. Most of the time, doing one or more of the above solves the problem but if not, speak to your rep and ask if this can be investigated. Remember they may be able to provide a loan one so you don't have to do without.

Troubleshooting checklist

1. Manage caries/ leaking restorations & place provisional restoration before rubber dam
2. Dry access cavity and canal
3. Choose a larger file
4. Ensure the file does not touch the access cavity walls
5. Check battery levels
6. Check cleanliness of contacts on file clip or touch probe and lip hook
7. Replace cables, clips and hooks
8. Send the apex locator for testing, repair or replacement