

Sheffield Test Background

The Sheffield Test, or One Screw Test, is a standard dental procedure used to evaluate the passive fit of implant-supported frameworks by checking their accuracy on master casts or in the patient's mouth. It is applicable to all screw-retained, one-piece metal frameworks, irrespective of their composition, fabrication method, or implant system. However, its effectiveness decreases when the interface between the framework and implant abutment is less visible for inspection.

How to Conduct the Sheffield Fit Test

The original Sheffield fit test was designed to be in two parts:

- Determine if a discrepancy in fit exists.
- Assess whether any discrepancy of fit is severe enough to warrant a framework re-make.

Preparation – The fitting surfaces of the framework, abutment heads and the master cast must first be scrupulously steam cleaned.

Part 1: Does a fit discrepancy exist?

Procedure:

- 1. Initial assessment** – Gently press the framework onto its abutment/implant replicas by hand.
- 2. Screw tightening** – Lightly secure one of the two most distal abutment/implant screws using the appropriate screwdriver. Use only clinical retaining screws, not laboratory or impression coping screws, for accuracy. Avoid using a torque wrench for this test.
- 3. Visual inspection** – Examine the entire framework under magnification (ideally 20x, but any magnification is better than the naked eye) for accurate horizontal and perpendicular fitting.
- 4. Fit evaluation** – If the framework passes this initial test, screw tightening can begin with any screw, as it indicates a passive fit throughout.
- 5. Secondary check** – If a slight vertical discrepancy or 'shadow' is observed between the framework and an implant/abutment replica far from the test screw, a second test may be necessary to confirm a satisfactory passive fit. In these cases a satisfactory passive fit may be confirmed by test two.

Part 2: Does the fit discrepancy warrant a re-make?

The materials needed for second part of this test include a 13mm wide strip of modeling wax, a room at 68°F/20°C. A 13 mm wide strip of modeling wax can exert a pressure of up to 20kN/m² without buckling. Alternatively, for higher levels of accuracy, can use a tension gauge. This is the current preferred method by ROE.

Procedure:

- 1. Bridge gap** – Place the wax strip over the suspected gap.
- 2. Apply pressure** – Apply finger pressure 1.5–2 cm from where the wax contacts the framework.

When spread over all the implants on the framework to place in the mouth, this force is insufficient to cause damage to the implants, retaining screws or the supporting bone.

Part 2: Fit Analysis

✓ **Satisfactory Fit**

If the gap closes without the wax distorting, this means that the discrepancy won't cause clinical issues. Proceed with framework.

× **Unsatisfactory Fit**

If the wax strip can close the gap/misfit but buckles and distorts, (meaning that more than 20kN/m² or 200 grams of pressure has been applied), the amount of pressure on the implants, retaining screws, and surrounding bone, could lead to the permanent damage of one or all.

Excessive pressure could:

- Stress implants and surrounding bone.
- Potentially lead to loss of osseointegration.
- Risk breaking retaining screws.

The framework should be remade.