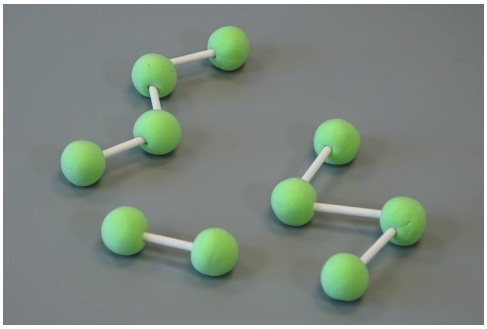
During the Application Phase, the bone cement is applied

What happens during the Application/Working Phase?
As soon as the bone cement no longer forms threads and is tack free (finger test), its actual use in the body of the patient can start: the bone cement is applied to the bone. Finally, the prosthesis is inserted onto the bone cement. Excess bone cement that is forced outwards by the insertion of the prosthesis must be removed with an instrument while the bone cement is still soft. The bone cement will also continue to become more viscous during the application process. For this reason, there is a limited window of time available for the working which varies depending on the type of cement and external conditions (e.g. temperature).

End of the Application Phase
The time frame of the Application Phase varies very much, depending on the surgeon's preferences regarding temperature and pre-fabricated initial viscosity. At the end of this phase, the bone cement material no longer adheres to itself. From now on, it should not be worked any longer.

The chemistry behind the Application Phase
During the Application Phase, polymer chain formation is continuing, converting MMA into PMMA. As the chains grow longer and crosslink among themselves, the bone cement becomes more viscous and finally is no longer able to permeate small structures such as bone trabeculae or the structure of the prosthesis.

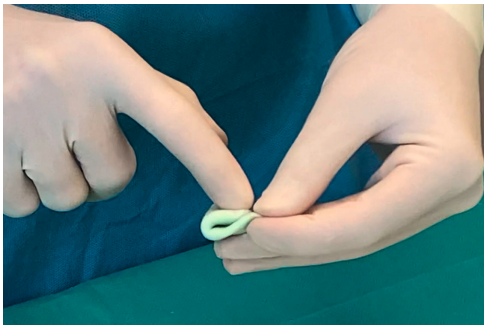


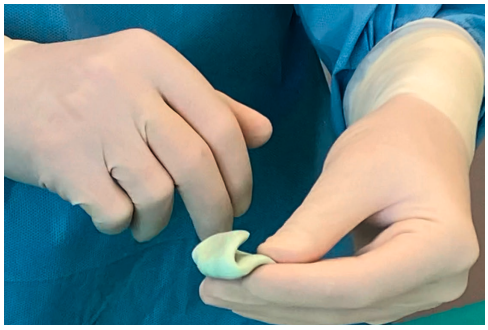
Continuous formation of longer polymer chains (molecular model)

When is the Application Phase over? Cookie test

Prepare a bone cement sample in the form of a disk (cookie) and fold it in half.
- As long as the cookie sticks, the bone cement is still workable.
- If the cookie springs open, the Application Phase is over and the implant must not be moved any more.

The sample should not be kneaded all the time to prevent a transfer of energy that would accelerate the setting process.





Cookie test: When folding the cookie sample it springs back open

Kühn [3]

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