

Injection Moulding Systems for the Processing of Dentures Bases Materials

Martyn Young, Cotswold Dental Laboratory, highlights the key factors when choosing an injection system.



As a lab owner, I am constantly looking at ways to improve the quality and service we give to the profession. When it comes to processing the dentures we as with most dental laboratories across the world use the conventional way of processing, namely

Flask and Pack and Press.

However I was always aware of some the short comings of the Flask and Pack method, namely having to over pack and then rely on the trial packing in the press then the final pressing, before clamping into the compress for curing.

Move towards private market

Because of the growing private market, coupled with higher patient expectations, as a laboratory owner I was aware that although this time age system does work perfectly well in most instances there were issues with it, i.e.: the risk of an open bite through over packing or not closing the flask adequately being one. I felt it was an issue we needed to address, to ensure the predictable results required.

I was already aware that there were several advantages to be gained by using an injection system.

- **There would be a greater accuracy of the fit surface**
- **The vertical dimension, could be assured, mainly due to the closed flask employed in the process.**
- **There would also be an increase in the density of the denture base material; this increase should also enhance the strength of the denture base.**

With so many injection systems on the market how did I decide?

I set myself a task of looking at all the systems on the market at the time.

To evaluate each one I set myself a list of criteria that I thought would suit our requirements:

- **How different to the time honoured way of investing**
- **How much extra time would be needed to use.**
- **Could conventional acrylics be used.**
- **Cost of equipment.**
- **Cost of sundry items required to keep using the equipment running.**
- **Track record i.e. how many were in use.**
- **Ease of use (how easy to operate.)**
- **What other equipment would be required to use the system .**

It was sometimes difficult to acquire all the technical information I needed to make the right decisions. Obviously all the manufacturers want to sell their system so they may not have been always open about all the **Pro's** and the **Con's** of their particular systems.

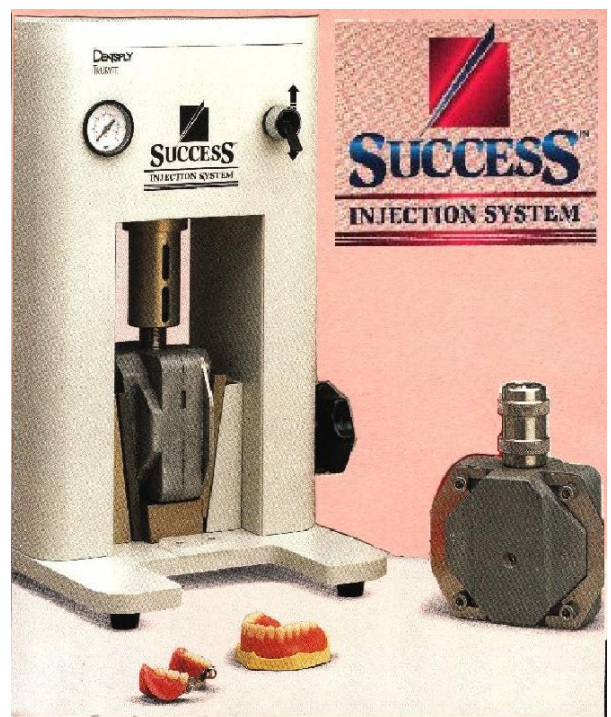
All of the systems on the market that I looked at required the use of special flasks for investing stage, however most were quite straight forward using plaster in the convention way to create a two part mould.

I slowly narrowed down my list of available systems and at this stage approached the one manufacturer whose system I thought looked most promising.

Below are some of the features of systems I rejected.

- **Some used a gel instead of plaster which looked easier, but these used a self cure acrylic and I was not happy to use this material.**
- **Some of the systems required special curing baths which meant the machine was out of use during the curing cycle, this would mean needing multiple units.**
- **Some of the systems had pre dosed acrylic this meant you were tied to their material.**

Degudent/Dentply the manufacturer of the Success Injection System, kindly agreed to allow a loan system with all the sundry items that was required to use it.



Below I have listed a shortened version with out all the small details of the process using the Success Injection System.

The flasks have a cutaway shape into which a plastic space maintainer is fitted, this will later be replaced with an injection socket. The bottom of the flask that the model with the waxed up denture on will be set, has a small hole that requires covering with wet tissue. Other than that investing the denture is quite conventional.

When the plaster has set, a wax sprue is attached that must not be more than **7mm** in diameter, one to the posterior edge of upper dentures and one to each posterior border of lower dentures in a 'Y' shape.

After applying a separator I use a silicon insulating material such as Flexistone Plus by Detax, to cover the buccal surface of the denture up to the occlusal / incisal surface this produces a very clean and smooth surface which requires minimum finishing.

The top half of the flask is then bolted to the lower half and the topping plaster is poured into the mould through the large opening, up to the very top of the occlusal surface, another coating of separator is then applied to this surface before the flask is completely filled with the plaster.

This, as can be seen is almost the same way of investing, with just a few modifications, which has to be said does take longer than the conventional way, but by only a few minutes.

The boiling out of the wax can be completed conventionally after loosening the bolts to allow for separation and removal of the space maintainer.

A suitable separator is then applied (cold mould seal) and the metal injector socket insert, is positioned into where the space maintainer was at the investing stage.

The flask is then reassembled using the bolts to clamp the halves together.

A plastic injection sleeve is then inserted into the injection socket ready to accept an injection cartridge with your choice of acrylic, this was a big plus for us as we wanted to choose the acrylic we used for our dentures.

When the acrylic reaches a **soft** dough stage the injection cartridge is loaded with the dough and a plastic plug is then pushed onto the acrylic to expel any air before positioning into the injection socket. A metal protective sleeve is then placed over the cartridge before the whole flask is clamped into the Success injection machine.

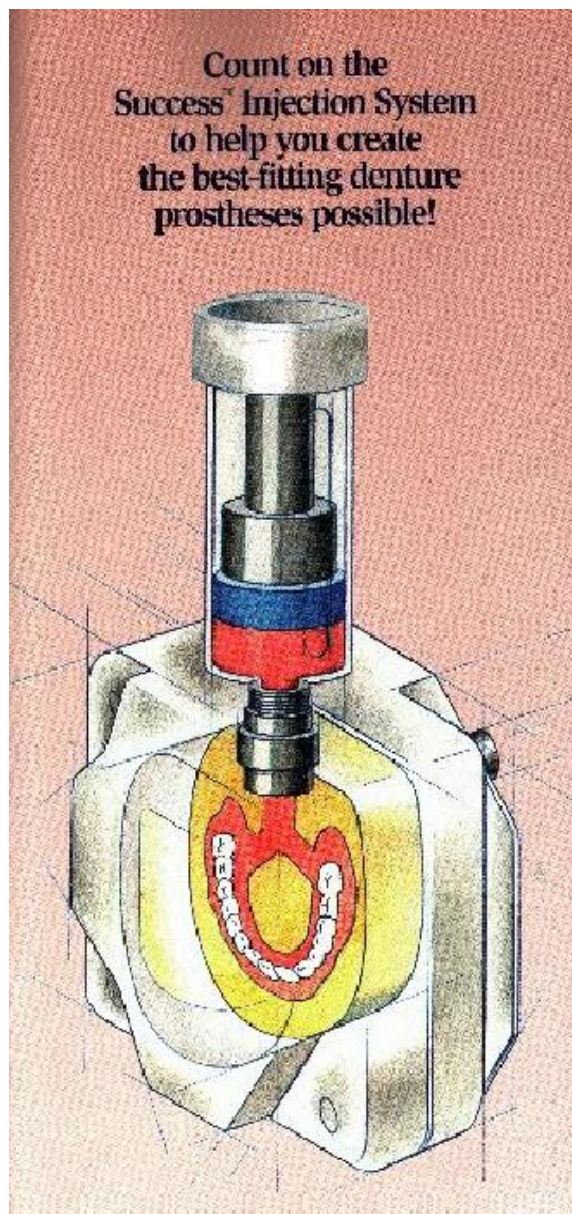
The success machine is connected to an air supply to provide a pressure of about **60 PSI or 4BAR** of pressure. With only a flick of a switch the piston comes down and pushes the acrylic into the mould. After allowing the piston to be fully down for about a minute the switch is flick again to retract the piston.

The acrylic cartridge is then removed and a pressing device which is spring loaded is screwed onto the injection socket. This device allows the acrylic to be held under pressure during curing and allows for the shrinkage that always occurs while processing acrylics.

After curing, which I always do overnight for about **9 Hours** to ensure maximum strength and minimum free monomer, divesting is simply done by removal of the retaining bolts and applying compressed air to the bottom hole that was earlier covered with wet tissue, to separate the flask halves and then removal of the plaster from the cured denture is made easier by the fact of firstly using a

silicon insulating material and secondly by having a separate layer just over the occlusal surface.

The sprues can then be removed and the denture finished in the usual way.



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Has been a qualified Dental technician since 1971 and is Director of the Cotswold Dental Laboratory Ltd which is a specialist prosthetic laboratory in Cheltenham Gloucestershire. For more information.

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