

HARD GELATIN CAPSULES - NEW DEVELOPMENTS FROM CAPSUGEL

John Controulis, Ph.D., Parke-Davis, Division of
Warner-Lambert Company, 201 Tabor Road,
Morris Plains, New Jersey 07950, USA

ABSTRACT

A tamper resistant hard gelatin capsule has been developed by means of a new capsule design. A very long cap reaches over the body part making manual opening almost impossible without damage to the shell.

TP-sealing is a new method of producing tamper proof hard gelatin capsules. This sealing method is suitable for all hard gelatin capsules and allows fillings such as powders, granulates, microcapsules, liquids or pastes to be used.

Hard gelatin capsules consist of two cylindrical parts, a body with hemispherical base fitted to a cap of the same shape. They have been manufactured on an industrial scale for about 100 years. Since then major technical improvements have been achieved, but the oval shape of the capsule did not change significantly as this is the optimal form for ease of swallowing.

Recently Capsugel developed a new type of hard gelatin capsule that is safer than the conventional

ones, without it undergoing any additional processing either before or after filling. It is still a two-piece capsule but the upper part extends so far over the lower part that only the rounded end of the latter is visible. Manual opening of such a capsule is impossible without damaging it since no surface can be gripped to pull the two halves apart. Furthermore, measurements made on the force needed to separate the closed capsule showed very high values - occasioned primarily by the locking groove.

This new hard galatin capsule bears the trade name CONI-SNAP SUPRO[®] and constitutes a logical further development of the time-tested CONI-SNAP[®], the technical advantages of which have been thoroughly taken over, such as:

- two pre-fill retainer notches
- secure final locking groove
- the tapered rim.

The additional advantage, however, is that the merging of the lower part of the capsule into the upper part protects the new CONI-SNAP SUPRO[®] to a very great extent against tampering, which is carried out more often than believed by patients, or third parties, in order to

- satisfy curiosity
- reduce dosage
- overcome resistance to swallowing.

All these factors lead to incorrect drug application, which could be prevented by using this new capsule type with its several advantages:

- more security, discernible by the patient too
- new and unusual shape (product image)
- improved product identification.

Product identification is characterized by the design, colour and imprinting of a logo, name or dosage

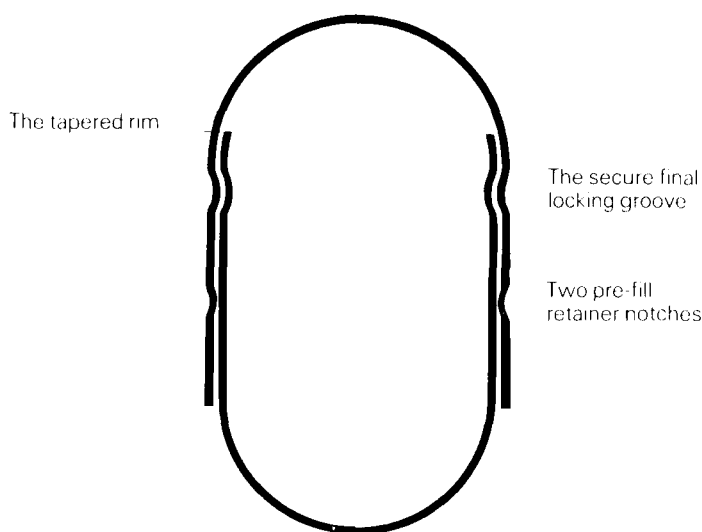


FIGURE 1

quantity. The long cap of CONI-SNAP SUPRO[®] offers a larger uninterrupted surface, which considerably improves the legibility of the imprint.

In order to distinguish CONI-SNAP SUPRO[®] clearly from other capsules so far manufactured, new size specifications (A,B,C,D,E) were adopted. Table 1 shows how the CONI-SNAP SUPRO[®] sizes relate to the previous capsule sizes and gives corresponding volumes.

By virtue of its shape, colour and imprinting, a hard gelatin capsule provides the manufacturer of pharmaceuticals with a dosage form which continues to be the 'outer covering' of a medicament preferred by patients - as the survey completed in February 1983 by the American 'Burke Marketing Research Institute' recently revealed. Over 1,000 patients gave their opinions on solid oral drug forms: 54% of them, i.e. the majority, stated preference for the capsule and only 29% and 13% of those interviewed chose the dragée and

TABLE 1

CONI-SNAP SUPRO [®] sizes	Volume (ml)	Corresponding traditional capsule sizes
A	0.68	0
B	0.50	1
C	0.37	2
D	0.30	3
E	0.21	4

the tablet respectively. Most patients gave as primary reasons for their preference:

- ease of swallowing, and
- high expectation of efficacy

both aspects being relevant for marketing and image.

The results of a similar study carried out in 1976 make an interesting comparison to these results. In that year 44% of those interviewed stated preference for the capsule, 26% for the dragée and 13% for the tablet. The proportion of those undecided (17%) was substantially higher than in 1983 (4%). This is an indication that patients are also becoming more conscious of the dosage form of a medicament - a trend that clearly shows a shift in favour of the capsule.

TABLE 2

	<u>1976</u>	<u>1983</u>
Capsule	44%	54%
Tablet	13%	13%
Dragée	26%	29%
Undecided	17%	4%

Patients' Preferred Drug Administration Form

In connection with the new and unusual design of CONI-SNAP SUPRO[®] it was of interest to know what patients and physicians think about it. To find this out, Capsugel commissioned two well-known Market Research Institutes (Joyner Hutcheson Research Inc., Atlanta/GA and Infratest, Munich). Of 399 patients interviewed, 87% considered the CONI-SNAP SUPRO[®] safer than conventional capsules. 61% would actually take into account the "safe drug form" CONI-SNAP SUPRO[®] when purchasing, should a choice be possible. Only 14% did not identify themselves with this concern for safety, while 25% were undecided.

TABLE 3

	YES	NO	UNDECIDED	TOTAL %
CONI-SNAP SUPRO [®] is more tamper resistant than the traditional capsule	87.2	10.3	2.5	100
Would purchase CONI-SNAP SUPRO [®] if choice between SUPRO/traditional capsule possible	61.4	13.8	24.8	100

Joyner Hutcheson Study (% of 399 patients)

In addition, physicians (156 had been involved in the study conducted by Infratest, Munich) are convinced that the launching of CONI-SNAP SUPRO[®] as a tamper resistant capsule is an important advance and the majority would prefer to prescribe a preparation in the new capsule rather than in the conventional type.

TABLE 4

Would you rather prescribe a preparation in the new capsule in future or in the conventional type?		
	General practitioners and internists together	
	<u>No.</u>	<u>%</u>
New design of capsule	82	53
Conventional design	50	32
No comment/I do not know	<u>24</u>	<u>15</u>
Total	156	100
	=====	

Infratest Study

For those manufacturers of pharmaceuticals who prefer the traditional capsule, but in a tamper proof "covering", Capsugel has developed TP-sealing, a process which completely seals two-piece hard gelatin capsules after filling.

TP-sealing is a process which neither affects the gelatin properties nor the shape or gloss of the capsule. Important also is that this "low stress" treatment of the capsule has in general no influence on the active ingredient it contains. The sealing unit required is easy to handle and can simply be added to the capsule filling process, either as a separate unit or combined with the filling machine. TP stands for "tamper proof", i.e. opening the capsule is not possible without destroying it. TP sealing can also be used to make capsules leakage proof, i.e. the filling of pastes and liquids into hard gelatin capsules is possible.