

An Assessment of the Efficiency of the Leister-Ghibli Hot Air Disbudding Gun

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Introduction

For many years the red-hot iron has been the method of choice for the de-horning of calves in the United Kingdom. Nevertheless, there can be little doubt that the method involves considerable tissue destruction and a certain degree of pain in the immediate post-operative period. It is therefore interesting to find that Leister-Ghibli have produced a hot air tool for the same purpose.

The Leister-Ghibli hot air tool has a wide variety of applications not only in the field of Veterinary Science but also in Human Medicine, Agriculture and laboratory work. In this study the efficiency of the gun for disbudding calves was investigated.

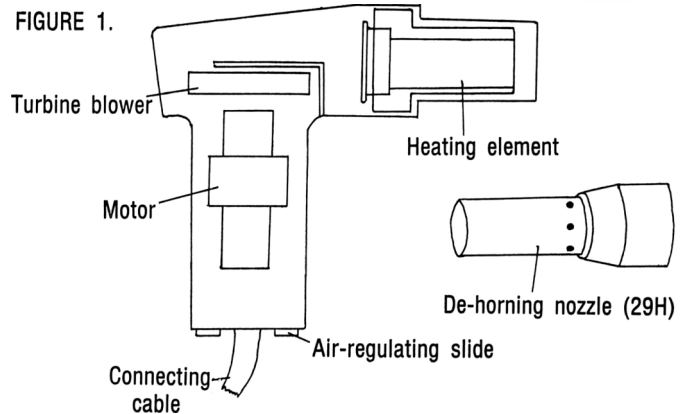
Review of Literature. Since this gun has only fairly recently been introduced in the U.K., research information with regard to its application as a disbudding tool is at present minimal, apart from general information distributed by the supplier Welwyn Tool Co. Ltd., and an article in the August, 1985 issue of 'Dairy Farmer.' Overall the main findings appear to be that by using this hot air tool the growth of horns in young calves 2-3 weeks of age can be stopped permanently with much less discomfort to the animal compared with conventional methods of disbudding. To add to this it has been found unnecessary to use an anaesthetic during the disbudding process, according to information concerning disbudding of calves on the continent. This latter statement is made on the 'General Information' hand-out provided by Welwyn Tools. However, under the Protection of Animals (Anaesthetics) Act of Great Britain 1964 an anaesthetic must be used for dehorning cattle and for disbudding calves unless this is done by chemical cautery during the first week of life.

Finally, the gun's application as a disbudder is also under investigation at the MAFF, ADAS Unit, National Agricultural Centre, Kenilworth, Warwicks.

Materials and Methods

The gun is a plug-in electrical device available in 240 volt or 110 volt versions. It comes with a 3m cable and weighs less than 1 kg. For disbudding the gun is fitted with a special nozzle 28H (Fig. 1). This gun is initially warmed up away from the animal by plugging in, shutting the air regulator

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slide, setting the temperature at maximum (600°C) and switching the tool on for 3 minutes.

31 calves of ages ranging from 2½-7½ weeks were used in this study conducted at Wyndhurst Farm, Langford, Bristol. The calves were disbudded in batches of varying size, each batch being disbudded at a different date to allow for easier monitoring. 27 calves were disbudded with the hot air gun whilst the remaining 4 were disbudded using a conventional Calor gas disbudding iron. In both cases the buds were desensitised via nerve blocks using 5cc of xylocaine local anaesthetic. The horn buds were also clipped of hair.

The gun was initially warmed up away from the calf to avoid exciting it by the sound of the motor. It was then switched off and the nozzle end immediately applied lightly over and perpendicular to the bud before switching the motor on again (Plate 1). The sterile hot air at 600°C was allowed to take effect for 20 seconds on the right horn bud and for 15 seconds on the left horn bud. The count at 15 seconds was to investigate whether or not it was sufficient time to prevent subsequent growth of horn. (Manufacturers recommend 15-20 seconds). The counts were taken using a stop watch since the gun has no form of timing device. For calves that struggled with resultant separation of the nozzle from the bud, the gun was re-applied and the count continued from where it was left off (recorded as break in count, BIC, in the results).

Calf head movement was restricted by an assistant during the disbudding process. Wounds were dressed with an antibiotic spray to minimise infection risks. The behaviour of

calves during and after the process was monitored and examinations of the calves were made regularly for several weeks to observe healing and development of horn growth, if any. This practice was also employed for the calves

disbudded by the gas gun.

Results

8 calves showed growth of horn after disbudding with the hot air gun. Those disbudded with the gas gun showed no growth. Of the calves that showed horn growth, four showed growth on both sides (i.e. 161, 167, 177 and 178). The remaining four calves showed growth on the left side only (179, 185, 187 and 191). All the calves showing growth were 5 weeks of age and over, except for 191 which was approximately 3½ weeks of age.

Healing of lesions. Immediately after disbudding with the hot air gun (Plate 4), a non-exudative encrusted lesion approximately 1.5 cm in diameter remained. There was no exposure of underlying tissues since the skin was still intact over the bud. However, some calves that struggled whilst the gun was applied resulted in the wound eschar being knocked off, since the end of the nozzle was quite sharp. None of these calves showed any ill-effects of horn growth subsequent to this trauma.

PLATE 1. Disbudding with the Leister-Ghibli hot air gun.



TABLE 1.

Date calves disbudded	Calf tag no.	Age of calf at disbudding	Disbudding Method	Comments	
23.10.85	164	6 wks. 5 days	Gas	Initial lesion approx. 1.5cm in diameter. Core of tissue removed. No subsequent horn growth recorded.	
23.10.85	166	5 wks. 6 days	Gas		
23.10.85	168	5 wks. 3 days	Gas		
23.10.85	172	4 wks. 6 days	Gas		
23.10.85	161	7 wks. 4 days	Hot air	Both 161 & 167 showed horn growth on both sides.	
23.10.85	167	5 wks. 4 days	Hot air		
23.10.85	169	5 wks. 3 days	Hot air		
28.10.85	173	5 wks. 4 days	Hot air	177 & 178 showed signs of horn growth on both sides. 179 showed growth on left side only. Remainder of group showed no growth of horn. * 176. BIC - RHS at 7 secs.	
30.10.85	174	5 wks. 4 days	Hot air		
30.10.85	176	5 wks. 2 days	Hot air		
30.10.85	177	5 wks. 2 days	Hot air		
30.10.85	178	5 wks. 2 days	Hot air		
30.10.85	179	5 wks. 1 day	Hot air		
30.10.85	181	4 wks. 1 day	Hot air		
30.10.85	182	4 wks. 0 days	Hot air		
8.11.85	183	5 wks. 1 day	Hot air		185, 187 & 191 showed growth on left side only. Remainder of group showed no growth of horn.
8.11.85	184	5 wks. 0 days	Hot air		
8.11.85	185	5 wks. 0 days	Hot air		
8.11.85	186	5 wks. 0 days	Hot air		
8.11.85	187	4 wks. 6 days	Hot air		
8.11.85	188	4 wks. 4 days	Hot air	188 struggled resulting in loss of skin over bud.	
8.11.85	189	4 wks. 3 days	Hot air		
8.11.85	191	3 wks. 3 days	Hot air	BIC-RHS at 9 secs.*	
22.11.85	197	2 wks. 5 days	Hot air	No growth	
22.11.85	200	2 wks. 5 days	Hot air		
29.11.85	193	4 wks. 2 days	Hot air	No growth	
29.11.85	196	3 wks. 5 days	Hot air		
16.12.85	194	6 wks. 4 days	Hot air	No growth * 194 BIC-LHS at 12 secs. Burnt area over bud knocked off during struggling (Calf 202)	
16.12.85	198	6 wks. 0 days	Hot air		
16.12.85	202	3 wks. 1 day	Hot air		
16.12.85	203	2 wks. 6 days	Hot air		
17.12.85	201	3 wks. 3 days	Hot air	No growth	

* BIC = break in count due to struggling

PLATE 2. Calf 185 showing growth of horn on left side only (10 weeks post-disbudding).



PLATE 3. Calf 161 eleven weeks post-disbudding showing bilateral horn growth.

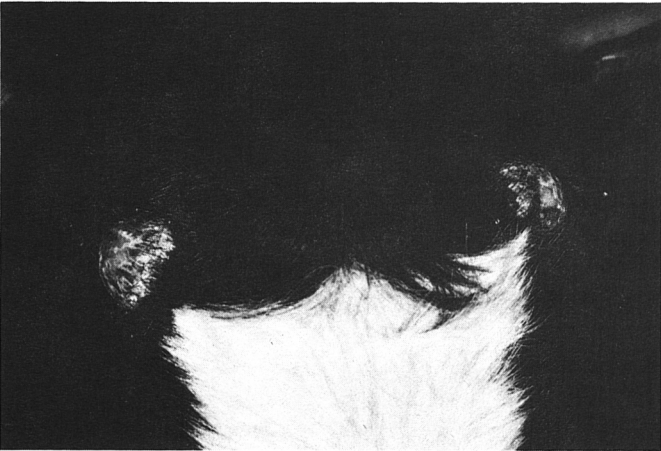
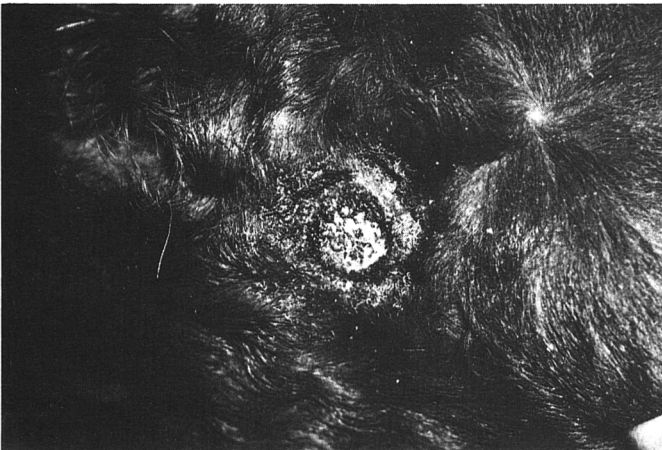


PLATE 4. Lesion seen immediately after disbudding with hot air gun.



In contrast to the hot air lesion, disbudding with the gas gun (Plate 5) left a circular lesion approximately 1.5 cm in diameter and 0.75 cm in depth. The core of tissue removed therefore left tissues deep to the skin exposed.

PLATE 5. Lesion seen immediately after disbudding with the gas gun.



PLATE 6. Lesion at 2 weeks post-disbudding with hot air gun.

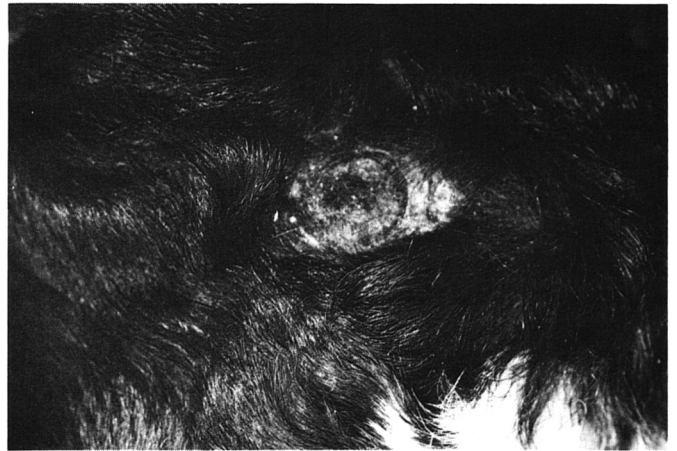
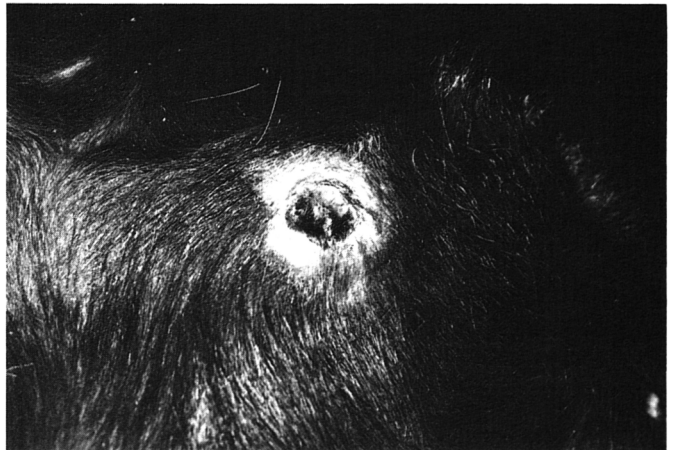


PLATE 7. Lesion at 2½ weeks post-disbudding with hot air gun.



Calves disbudded with the gas gun resented palpation of the lesions for a longer period compared with calves disbudded with the hot air gun.

The hot air lesions became domed due to swelling over the

PLATE 8. Loss of eschar 4 weeks post-disbudding with hot air gun.

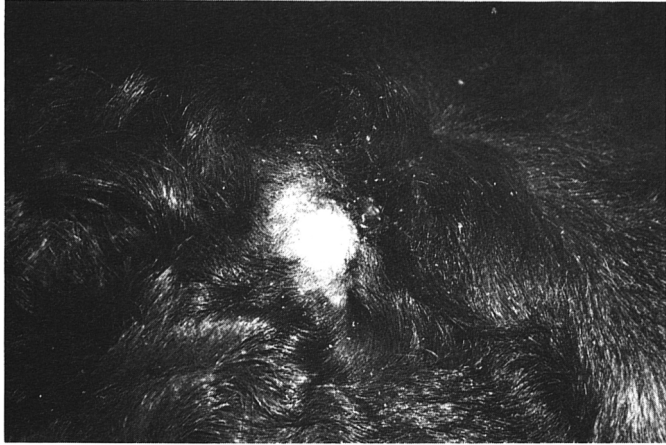


PLATE 9. Seven weeks post-disbudding. Total growth of hair.



first 2-3 days, followed by darkening and thickening of the eschar by approximately 2 weeks (Plate 6).

At 2½-3 weeks the eschars began separating from underlying healthy tissue (Plate 7).

The eschars were lost by approximately 4 weeks, followed by total regrowth of hair over the new tissues by 7 weeks (Plates 8 & 9).

The lesions produced by the gas gun were totally healed by 6-7 weeks and no growth of horn was recorded.

Overall disbudding times: Hot air gun - approximately 40 sec.

Gas gun - approximately 30-35 sec.

Cost of Equipment:	Hot air gun	£178.00 + VAT
	Calor gas disbud-	£36.95 + VAT
	der (+ cylinder)	(Rental of cylinder
		£7.00)
	Electric calf	£50.12 + VAT
	disbudder	

Discussion

From the results obtained it would appear that the hot air method for disbudding has several advantages over the gas disbudder. It causes less tissue damage and a subsequently shorter period of pain to calves. There is less likelihood of

infection post disbudding, since the tissues deep to this skin are not exposed unless the wound eschars are subjected to trauma. At this point of the discussion it is worthy of note that at birth the horn buds are covered by a thickened stratum corneum and hair. The hair follicles soon degenerate and the hair is rubbed off with the friable pariderm. If allowed to develop the papillae of the corium elongate so that the proliferating epidermal cells form horn tubules. The underlying bone proliferates and raises the cornual processes which are at first solid but invaded by the frontal sinuses at about six months (Habel). Prevention of horn growth is brought about by cauterisation of the germinal epithelium lying between the cornified layer and the corium. The surrounding epidermis which later spreads to heal the wound lacks the specialised capacity of the original covering (Dyce & Wensing). Hence, excessive destruction of tissue with unnecessary exposure to underlying bone can be avoided.

Prevention of horn growth appears to be achieved with the hot air method provided calves are under five weeks of age and that a 20 second count is employed. Furthermore, the risk of burning other tissues about the calf's head as well as the assistant restraining the calf is minimal, as long as the gun is held perpendicular to and against the horn bud, so that no hot air escapes sideways from the end of the nozzle. It is also important to switch the machine off before applying the nozzle against the bud, whenever the calf struggles free of the gun and before removal of the gun from the bud post-disbudding.

Disadvantages of the hot air gun were predominantly related to its design. I found the gun quite difficult to switch on and off whilst holding it in one hand, as a consequence of the location of the on-off switch and the distance my thumb had to travel to reach it. (I am right-handed). This problem was also experienced by several other people who operated the gun. A 'trigger' switch incorporated into the handle would have been easier to operate.

Some form of timing device incorporated into the gun would also have been useful since it was difficult to operate and monitor a stop watch whilst disbudding. (A rough 20 second count could have been used providing it is fairly accurate. Under counting however may result in subsequent horn growth in calves disbudded later than the 2-3 week age recommended by the manufacturers and more importantly over-counting subjects the calf to increased burning of tissues).

The motor had to be kept running in between consecutive calves since it appeared that there was insufficient heat to carry out the disbudding process if the motor was routinely switched off.

In relation to the cost of the gun, it was considerably more expensive than the gas disbudder or other forms of disbudding tool. However, since this gun has other applications with respect to agriculture in particular, then the cost may be made more justifiable if these additional uses are taken into consideration.

Finally, none of the calves were disbudded without an anaesthetic since it did not appear that the process would be sufficiently pain-free enough not to merit one.

Suggestions for further work

It would have been interesting to have monitored the growth rates of calves after disbudding them using the two types of gun employed in the project. This would have allowed a comparison of any subsequent growth checks to have been made.

Acknowledgements

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References

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Student Clinical Reports

The AABP Board of Directors meeting in Washington, D.C. on July 21, 1980 approved a recommendation from the Forward Planning Committee to encourage veterinary medicine students to write case reports for The Bovine Practitioner.

The first prize (\$200) is awarded this year to **Patrick Hady**, University of Wisconsin (see p. 198).

The second prize (\$100) is awarded to **Hugh H. Hildebrandt**, University of Wisconsin (see p. 206).

The third prize (\$50) is awarded to **Mary Ann Borden Evans**, Oklahoma State University (see p. 209).

Myron Moroz, University of Bristol also receives a prize of \$50 (p. 212).