

Emergency Hard Metal Ring Removal

Standard Ring Cutters are Ineffective for Removing Modern Hard Metal Rings

Society of Academic Emergency Medicine, 2010 Annual Meeting, Phoenix, AZ

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Background

Modern hard metal rings (stainless steel, tungsten carbide, platinum) are often impossible to cut in the emergency department (ED) using standard ring cutting methods

Objectives

The objective of our study was to determine if a high speed rotary tool is safe and effective in removing hard metal rings vs. the standard method

Methods

Design: Prospective

Setting: Level 1 Trauma center with an Emergency Medicine residency program

Subjects: Five healthy volunteers

Materials: 14 rings of various metals (titanium, stainless steel, tungsten carbide, silver, gold and platinum), carrots, hand and face protection, a stop watch, a towel, 60mL syringe, cold water

Tools: A standard ring cutter, electric ring cutter and Dremel were used for cutting.

Main outcome measure: See Table 1. Ring Cutting Tools and Times.



Results

- The manual ring cutter cut gold, silver and platinum easily; however stainless steel and titanium took substantial time and effort
- The Dremel successfully cut the modern hard metal rings relatively quickly
- Neither method was effective for tungsten carbide



Limitations

- There is variability in metal rings with regard to heat temper, grade and manufacturer; not all metals were cut and timed for this study
- We used an electric ring cutter (modified with a drill) and a Dremel, we did not test any improvised or other devices on the market
- All EDs may not have access to a high-speed rotary tool or have a policy concerning use of a high-speed rotary tool in the patient care setting.

Conclusion

The electric ring cutter and the Dremel cut modern hard metal rings made of titanium and stainless steel that the manual ring cutter could not cut. None of the cutting methods used were able to cut tungsten carbide, however, tungsten carbide is brittle, it was easily shattered with a light tap of a hammer.

Acknowledgements

We thank the Warner Company Jewelers and the Fresno Coin Gallery for supplying rings for the study.



Table 1. Ring Cutting Tools and Times

	Gold	Silver	Platinum	Titanium	Stainless Steel	Tungsten Carbide
Manual Ring Cutter	3:10	0:47	4:40	10:24	***	***
Electric Ring Cutter	---	---	---	3:10	0:28	***
Dremel (Carrot)	---	---	---	2:07	1:22	***
Dremel (Finger)	---	---	---	6:30	2:58	***

Times are represented in mm:ss format

*** = the metal was unaffected by cutting after 15 minutes

--- = no cut was attempted for this type of metal as the standard method was known to be effective

➤ Tungsten Carbide was not affected by any method; however, it was shattered with a hammer and by vice grips

