Chronic Total Occlusion (CTO) Treatment Device Project

April 28, 2008

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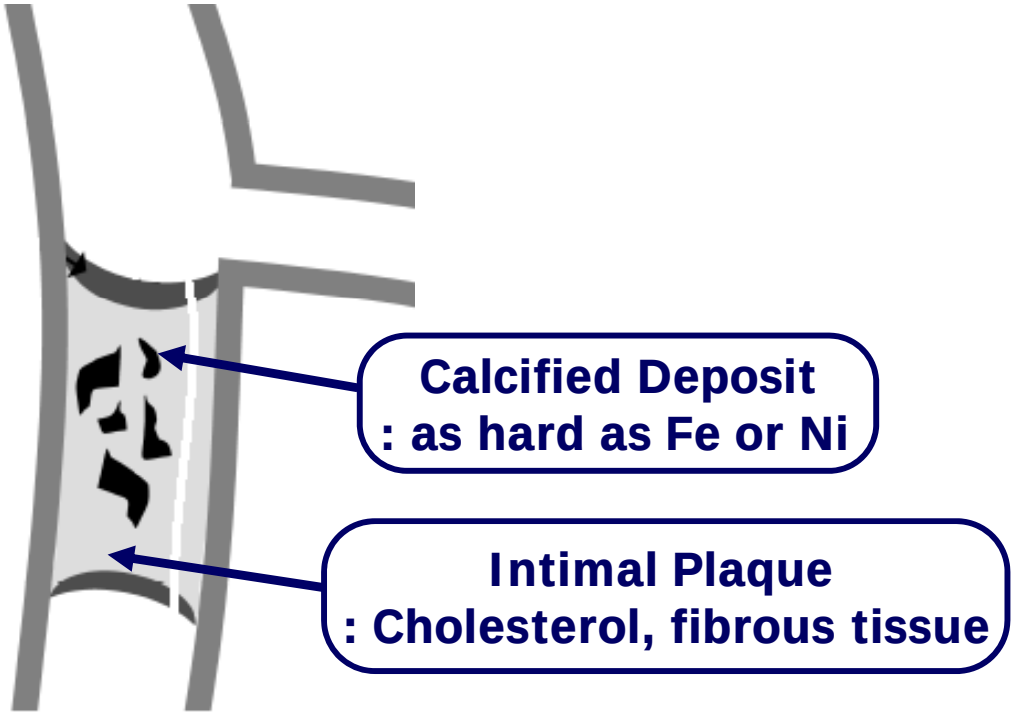
Contents

Introduction - Background

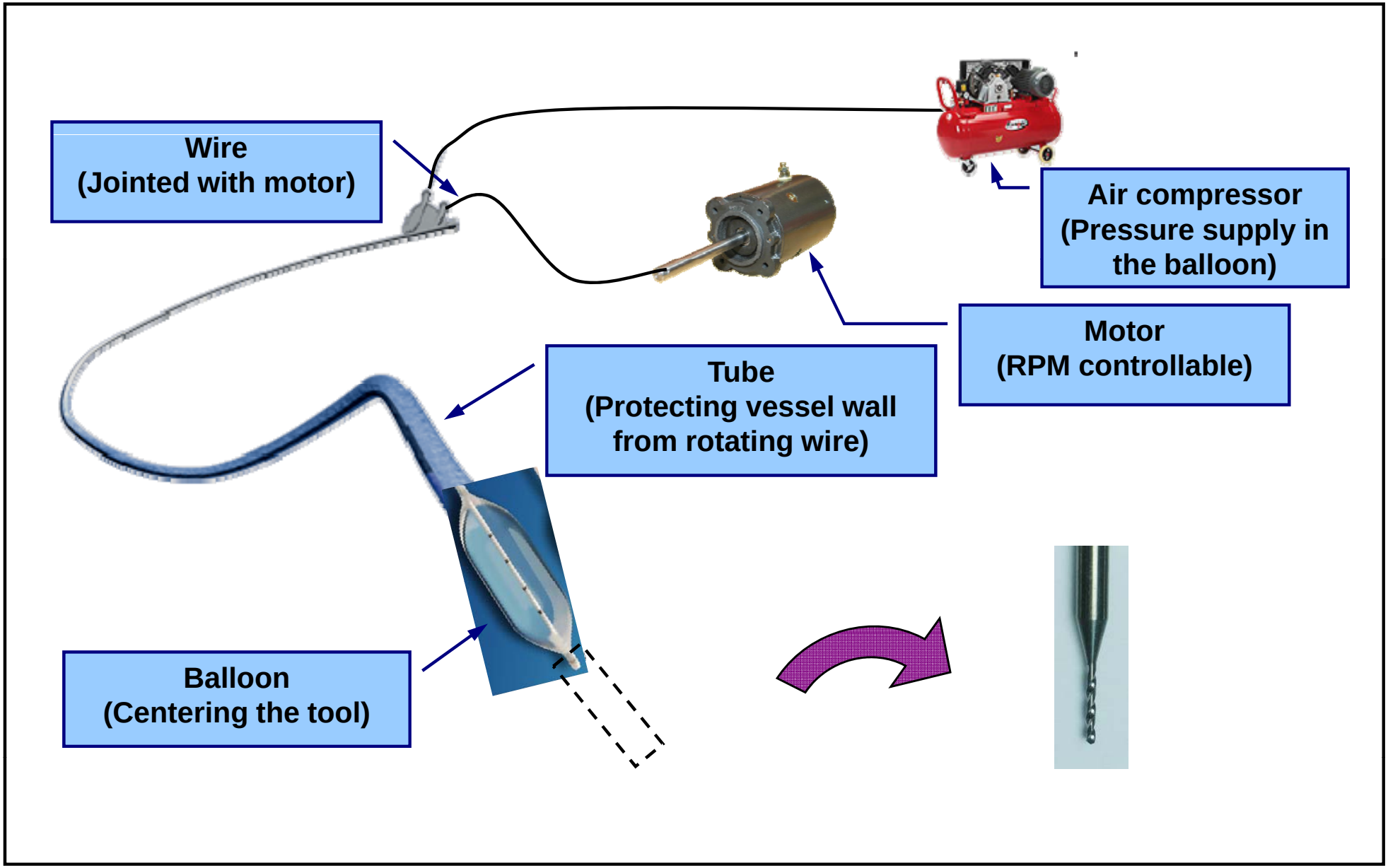
- **Chronic Total Occlusion (CTO)**



The surgery success rate for ordinary cardiovascular disease : 95%

However, in the case of CTO : less than 60%

Conceptual Design of CTO Device



Detail Design – Requirements

Functional Requirements for CTO Device

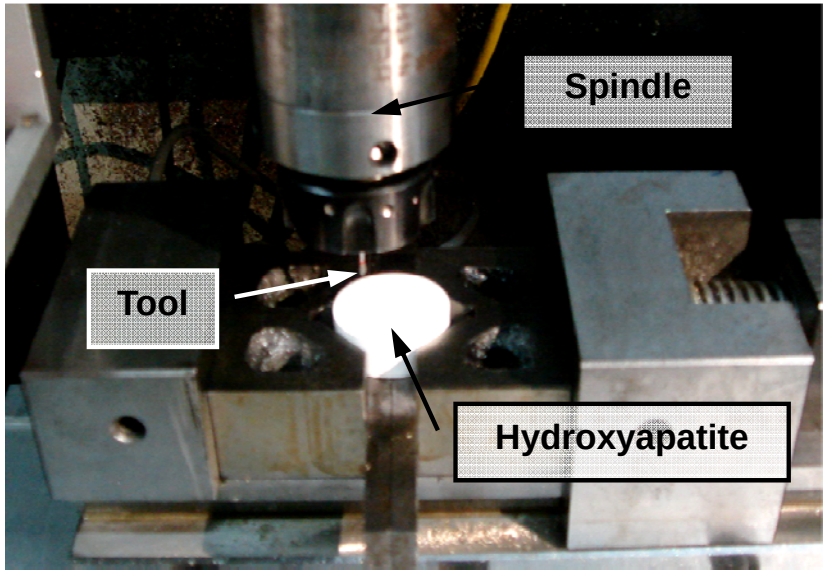
- Remove hard deposits
- Be sure that wire can carry torque to the tool
- Centering ability

Detail Design – Tool selection (1)

- **Drilling test for tool selection**

Dental Burr : Diamond particles on steel sank

Ball endmill :

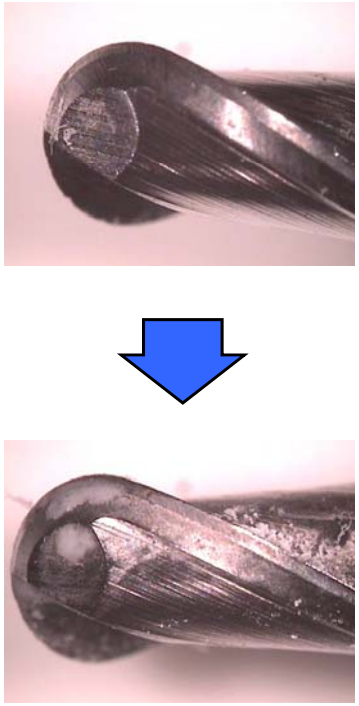


Drilling conditions	
Spindle speed	20000 rpm
Feed rate	0.5 mm/s
Depth of cut	2 mm
Target material	Hydroxyapatite

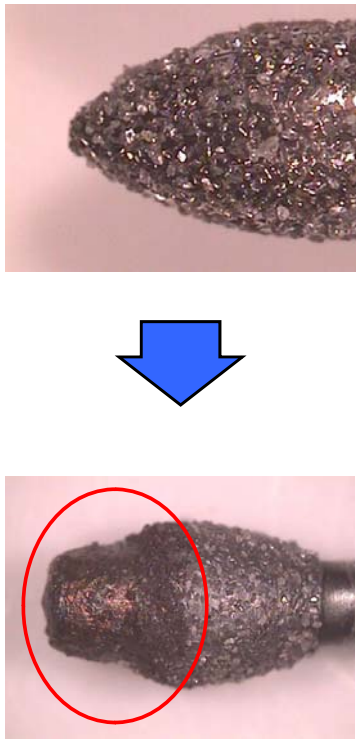
Detail Design – Tool selection (2)

- **Drilling test result**

Ball Endmill



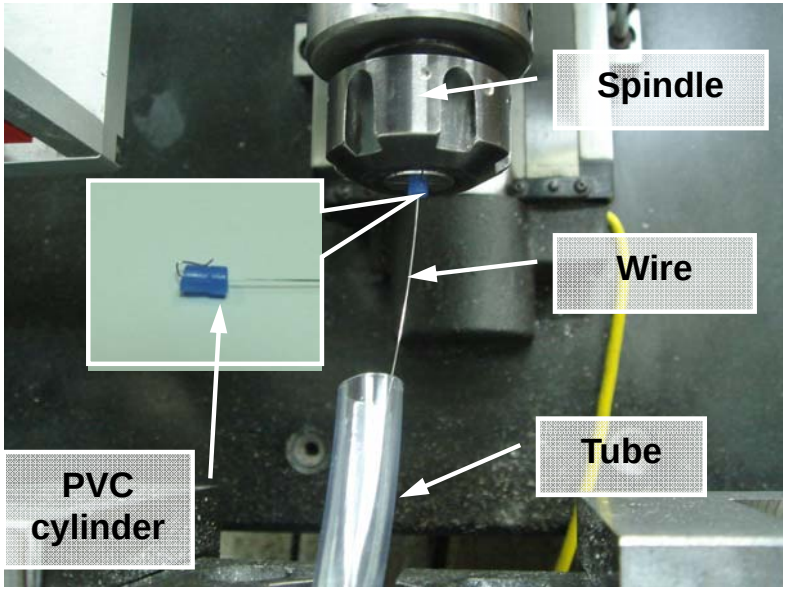
Dental Burr

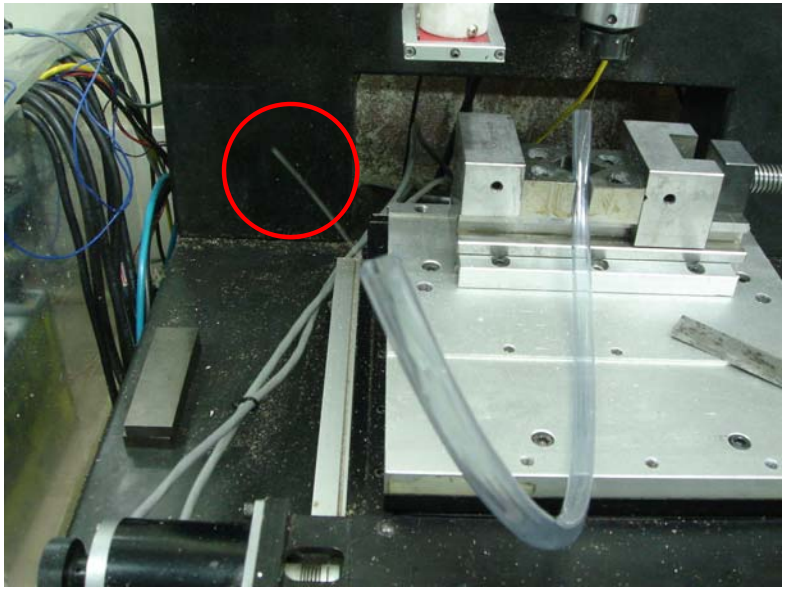


Ball Endmill is selected for the CTO Removal Tool !!

Detail Design – Wire

- **Test for torque transfer through the wire**
  - Wire is connected to a spindle
  - Test speed : 5000 ~ 20000 rpm
  - Wire diameter : 0.21 mm

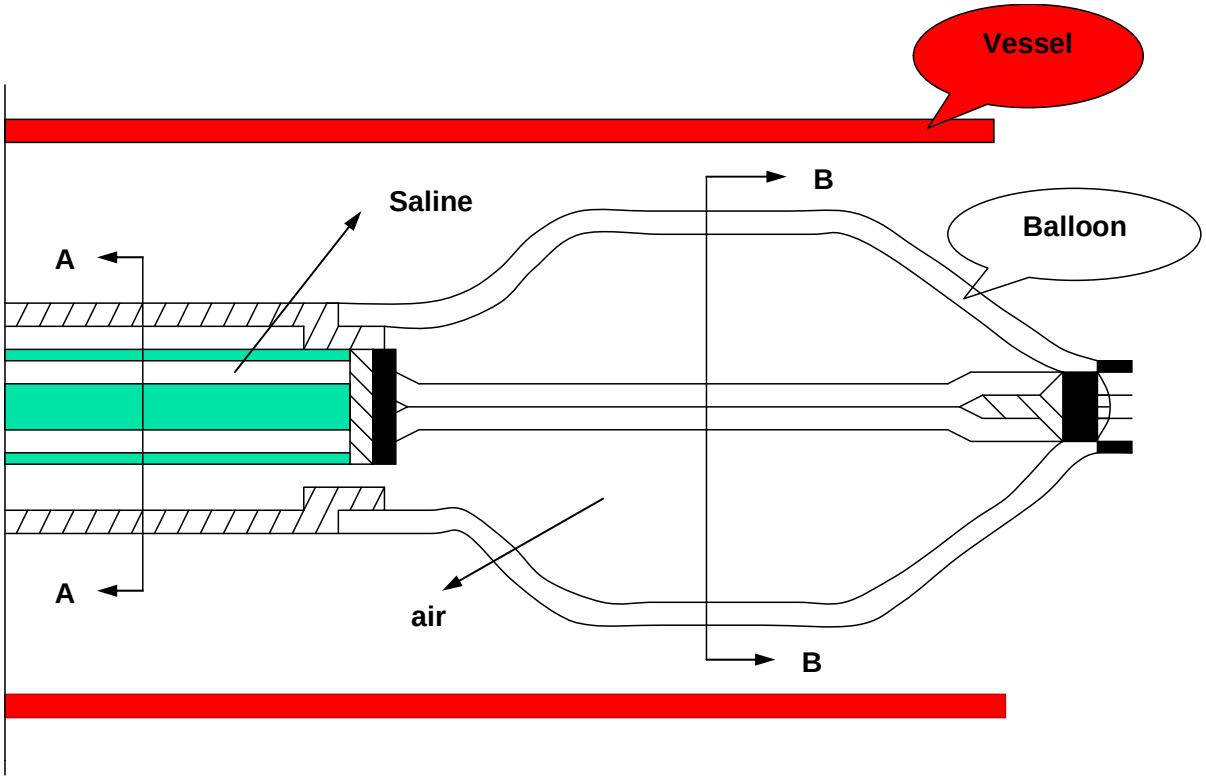


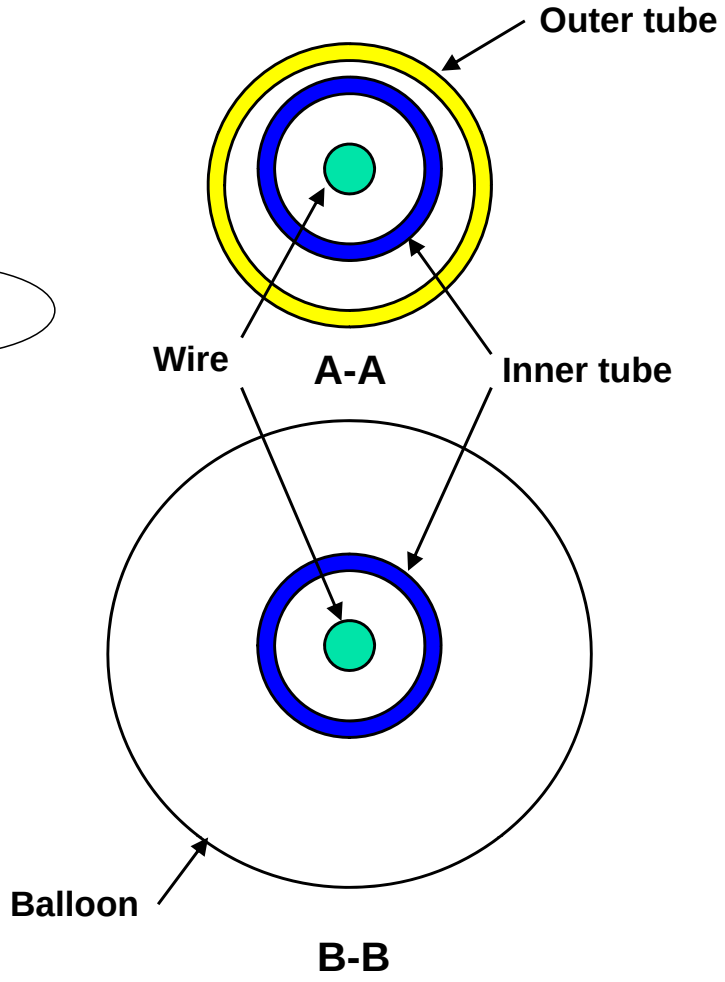


Wire can transfer torque to the tool !!

Detail Design – Balloon and Tubes

- **Balloon and Tubes**
  - Outer and inner tubes
  - Air path to inflate the balloon and saline path to cool down
  - Wire at the center





Future works

- **Future works**
  - Fabrication of parts
    - Tool, balloon, wire and tubes
  - Assembly
    - Attaching the balloon on the outer tube
    - Connecting the wire and the tool
  - Test of prototype
    - Test environment similar to blood vessel

Schedule

Schedule Table

Plans	Apr	May	Jun	Remarks
Detail part design				Specifications
Developing components				
Assembly & fabricating prototype				
Test				Final Presentation

THANK YOU