Guidewires for the CTO Interventionalist

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Guide Wire Components

1. Core Material
2. Core Diameter
3. Core Taper
4. Tip Style
5. Covers and Coils
6. Coating
Core Material

High Tensile Strength Stainless Steel

- More durable than regular stainless steel
- Retains shape
- Good flexibility
- Excellent steering and tracking
Core Material

Nitinol

• Super-elastic alloy designed for kink resistance
• Excellent flexibility and steering
• Durable nature may facilitate treatment of multiple lesions and/or tortuous vessels
Core Taper

• Tracking
  • Ability of wire body to follow tip around bends

• Degree of support
Core Taper

**Longer taper**

**Shorter taper**
Core Taper

- Gradual or long tapers produce a wire with less support but which tracks successfully.
Core Taper

- Abrupt or short tapers produce a wire which provides greater support but also greater tendency to prolapse
Tip Style

• Affects steering and tip softness
• Design options
  – *Shaping ribbon for softer tip allowing shape retention*
  – *Core-to-tip for precise steering and tip control*
Spring Coils

- Affect support, trackability, and visibility
- Impact dimension of wire
- Provide tactile feedback
Covers

- Polymer or plastic
- Provide lubricity
- Smooth tracking through tortuosity
Guide Wire Covers and Coatings

- Polymer Cover with Hydrophilic Coating
- Hydrophilic Coating
- Hydrophobic Coating
- No Coating

Tactile Feedback (related to coils)
Tip Size

Small
• Easier lesion crossing

Tapered
• Narrow tip profile with torque and tip control

Tapered .009” tip

Standard .014” tip

0.007” micro channel

0.007” micro channel
What is penetration power?

Penetration Power = Tip Load / Tip Area

Penetration Power = Tip Load / $\pi (D/2)^2$
Penetration Power is more comprehensive than Tip Stiffness

### Tip Stiffness (g)
- Miraclebros 12 (13.0g)
- Confianza Pro 12 (12.4g)
- Confianza Pro 9 (9.3g)
- Miraclebros 6 (8.8g)
- Miraclebros 4.5 (4.4g)
- Miraclebros 3 (3.9g)

### Penetration Power (kg/in²)
- Confianza Pro 12 (12.4g, Ø .009” tip, 195 kg/in²)
- Confianza Pro 9 (9.3g, Ø .009” tip, 146 kg/in²)
- Miraclebros 12 (13.0g, Ø .0125” tip, 106 kg/in²)
- Miraclebros 6 (8.8g, Ø .0125” tip, 72 kg/in²)
- Miraclebros 4.5 (4.4g, Ø .0125” tip, 36 kg/in²)
- Miraclebros 3 (3.9g, Ø .0125” tip, 32 kg/in²)

Tests performed by and data on file at Abbott Vascular.

*Note: tip diameters based on published data; information on file at Abbott Vascular.*
Wire classification

• Work Horse
  – Purpose: To get you to proximal cap and get exchange catheter to proximal cap
  – BMW, Prowater, Stabilizer, Cougar, Luge, IQ, etc.
**Antegrade Dissection ReEntry**
- Dissection Method: CROSSBOSS
- 1. No Proximal Cap Ambiguity
- 2. Lesion <20mm
- 3. +/- Good target
- 4. Refractory
- ReEntry Method: STINGRAY
- Clear Path and Target
- Unclear Path and Target, +Tortuosity
- PILOT 200

**Retrograde Dissection ReEntry**
- Dissection Method: KNUCKLE WIRE
- 1. + Proximal Cap Ambiguity
- 2. Lesion >20mm
- 3. Poor target
- 4. Refractory
- ReEntry Method: REVERSE CART
- Clear Path and Target
- Unclear Path and Target, +Tortuosity
- PILOT 200

**Wire Escalation**
- Soft Polymer Jacket Probe (IEDLER XT, CONFIANZA PRO 12g)
  - 1. No Proximal Cap Ambiguity
  - 2. Lesion <20mm
  - 3. Good target
- Clear Path and Target
- Unclear Path and Target, +Tortuosity
- PILOT 200

**Refractory**
Antegrade Wiring Algorithm

Wire Escalation

Fielder XT

Knuckle wire

Clear Path and Target
CONFIANZA PRO 12g

Unclear Path and Target, +Tortuosity
PILOT 200

Game changing event
• ASAHI FIELDER™ XT maintains a softer tip, with a 0.009” taper*
Wire Classification: Wire based Strategies

• Polymer Jacketed Hydrophillic Wires
  – Fielder (XT, FC), Pilot 200
  – Purpose
    • Fielder XT- Tapered tip 0.009”
      – traverse Non-visible Microchannels
      – No Tacticle Feedback, easy to get sub-intimal
      – Soft can traverse non-visible channels across CTO
      – Great wire to Knuckle
Abbott Vascular Hi-Torque PILOT Family

Abbott Tip Stiffness (Load) Value at 10mm:
- PILOT 50  1.5g
- PILOT 150  2.7g
- PILOT 200  4.1g
Pilot 200

- Polymer Jacket wire non-tapered stiff Wire
  - Jack of all trades
  - Puncture caps
  - Traverse tortuous path
  - Big knuckles with lots of push
  - Redirect out of side branch either with wire or knuckle
  - Stick and Swap via Stingray Balloon
ASAHI CONFIANZA™ Pro
Tapered Tip Guide Wires

- Characteristics:
  - Tip Load — 12.0g
  - Tapered Tip — .009"
  - 20 cm Radiopacity
  - Joint-Less Technology
  - Hybrid Coating

- Strengths:
  - Puncture
  - Goes straight
  - Goes where you want it to
Collateral Wires

- Fielder FC, Non-tapered
  - Traverse collaterals for retrograde approach optimal for Septals
  - Should have little to no resistance during passage
  - Once across with microcatheter remove for other wires
- Sion, non-tapered unique double core non-jacketed wire
  - Purpose built for epicardial collaterals but good with tortous visible vessels.
  - Body is soft can be difficult to get devices across
• ASAHI FIELDER™ FC maintains a softer tip, more intermediate support*
ASAHI® SION Guide Wire Design includes:
1. Composite Core Technology
2. Stainless steel high tension core
3. Jointless spring coils
4. SLIPCOAT hydrophilic coating over entire working length
5. 3 cm radiopaque coils

Illustrations are artists renditions. Not drawn to scale
Specialty Wires: Stingray wire – Tapered 12 gram wire with probe to make puncture via stingray balloon
Specialty Wires: Externalization

- RG3 from Asahi 0.011” 330 cm dedicated wire Best in class, currently not available in the US.
- ViperWire Advance 0.014/0.014” 335cm Peripheral wire very stiff easy to push
- R350 Vascular solutions 350cm nitinol wire with softer body and tip
• 0.012” stainless mandrel, tapers to 0.006” under distal coils

• 0.001” PTFE coating over mandrel, resulting in 0.013” O.D.

• Silicone wiped; no hydrophilic coating
Conclusions

• Simplified list of wires
• Know the properties and “feels” of each wire.
• Experience is key to feel.
• Don’t take shortcuts