


The 44th Annual International Congress of the
**EGYPTIAN SOCIETY OF
 CARDIOLOGY**
 CardioEgypt2017



20-23
 February 2017
 Sharm El-Sheikh

Guidewires in 2017- an Update

Mohamad Ashraf Ahmad, MD
 Lecturer of Cardiology – Assiut University

AGENDA

- Historical background
- Components of the guidewire
- Specifications of the wires
- Recent guidewire
- Choice of guidewires
 - Workhorse wires
 - Bifurcation lesions
 - Tortuous artery
 - Thrombotic lesions
 - Dissections
 - CTO




The 44th Annual International Congress of the
**EGYPTIAN SOCIETY OF
 CARDIOLOGY**
 CardioEgypt2017



Historical background



•GRUNTZIG First performed Angioplasty in 1974
 •1977 – First coronary angioplasty
 •Polyvinyl Chloride balloon catheter with short guidewire attached to its tip



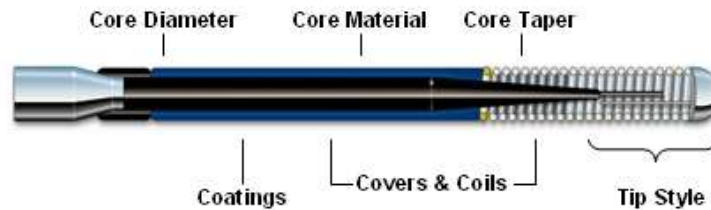
•1982 – Simpson reported First experience with over the balloon system
 •It had an independently movable guidewire within the balloon dilation catheter

Guidewire technology has since advanced significantly, with a wide selection for different lesion characteristics and vessel anatomies.



Structure of guidewires

- Core material
- Core diameter
- Core taper
- Tip style
- Covers and coils
- Coating

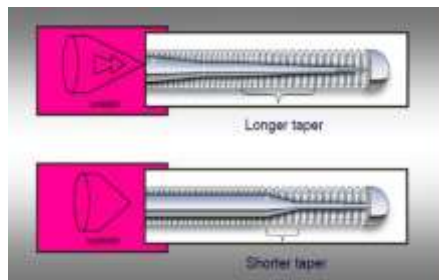


The Core of the wire

- It is the inner part of the wire.
- The proximal end is predominantly made of steel.
- The shorter distal end is generally either stainless steel, nitinol or durasteel .
- Core material determines properties such as tip load, flexibility, steerability, trackability, and support.



- The thickness of the core directly corresponds to the support of the wire; the thicker the core, the higher the support and the less the flexibility.
- Core tapering
 - Long taper
 - Short taper

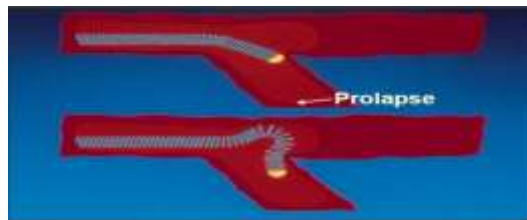


Core Tapering

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



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



Tip of the wire

- Core to tip design:

Good tactile feedback and tip control with a torque rate close to 1:1

A - core-to-tip design



- Shaping ribbon design:

Good shape retention and a unique softness and flexibility of the tip, although at the cost of less tip torque control

B - shaping ribbon design

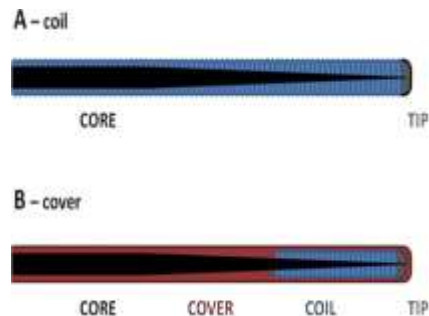


- Taperd tip:
- Conventional wires are typically 0.014 inches in outer diameter from the proximal end up to the distal tip.
- In more dedicated wires tapering of the tip facilitates penetration.



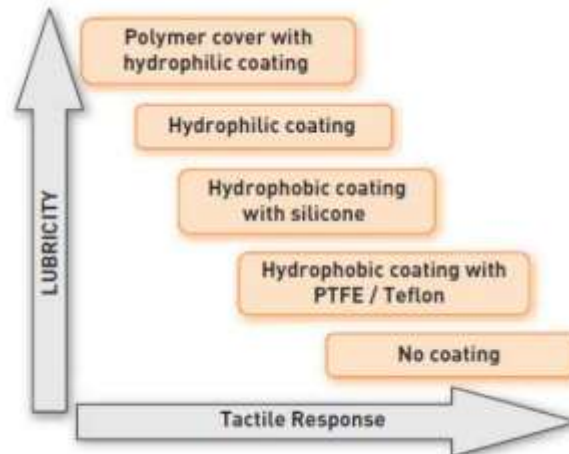
Coil and Cover

- Coils (shape retention and proper tactile feedback)
- Polymer (plastic) cover gives excellent lubricity trackability with less tactile feedback.



Coating of the wire

- **Hydrophilic coating:**
 - Create a slippery 'gel-like' surface.
 - It makes the wire more lubricous and easier to advance.
 - Less tactile feedback.
- **Hydrophobic coating:**
 - Repels water to create a 'wax-like' surface which enhances tactile feedback but decreases slipperiness and trackability
- **Hybrid coatings:**
 - Combine hydrophobic tip coils for tactile feedback and tip control with hydrophilic intermediate coils for smooth device delivery..



Specifications of guidewires

- The specifications of a guidewire can be described using the following terminology:
- **Torquability:** The measured ability of a rotating element, like a shaft, to overcome turning resistance. The ultimate goal of achieving 1:1 steering.
- **Trackability, deliverability or crossing:** The wire's ability to follow the tip and to be advanced smoothly along the vessel, through stenoses or even occlusions.



- **Tactile feedback:** The kind of response the operator can detect regarding any resistance in torque or advancement occurring at the tip.
- **Tip load or tip stiffness:** Tip load is a measure of the force needed to buckle the tip when forced against a standard surface. The tip load of available guidewires typically varies between the range of 0.5–15 g.



- **Support:** A measure of a guidewire's resistance to a bending force.
- A more supportive wire can aid in device delivery and vessel straightening, while a less supportive wire can aid in accessing through tortuous anatomy.



Table 1 Detailed description of various, currently commercially available guidewires, dedicated for ordinary anatomies

Product	Core*	Tip	Design	Diameter	Tip load (g)	Tip coating	Radiopaque (cm)	Support
Mt Zieger Light	Steel	Spring coil	Shaping ribbon	0.014" ntp	n/a	Hydrophilic	3	Light
Mt Cougar LS	Nitinol	Spring coil	Shaping ribbon	0.014" ntp	n/a	Hydrophilic	3	Light
Abb Whisper Light support	Steel	Polymer	Core-to-tip	0.014" ntp	0.8	Hydrophilic	3	Light
Bic Choice Floppy	Steel	Spring coil	Core-to-tip	0.014" ntp	0.8	Hybrid†	2.8	Light
Abb Powerman Ultraflex	Steel	Coil	Core-to-tip	0.014" ntp	0.9	Hydrophilic	3	Light
Bic PT 2 light support	Nitinol	Polymer	Shaping ribbon	0.014" ntp	2.5	Hydrophilic	2	Light
Mt Zieger medium	Steel	Spring coil	Shaping ribbon	0.014" ntp	n/a	Hydrophilic	3	Moderate
Mt Cougar MS	Nitinol	Spring coil	Shaping ribbon	0.014" ntp	n/a	Hydrophilic	3	Moderate
Abb Balance middle weight	Nitinol	Coil	Shaping ribbon	0.014" ntp	0.7	Hydrophilic	3	Moderate
Asa Size	Steel	Coil	Core-to-tip	0.014" ntp	0.7	Hydrophilic	3	Moderate
Asa Fielder FC	Steel	Polymer	Core-to-tip	0.014" ntp	0.8	Hydrophilic	3	Moderate
Bic Luge	Steel	Spring coil	Core-to-tip	0.014" ntp	0.9	Hybrid†	3	Moderate
Abb Powerman flex	Steel	Coil	Core-to-tip	0.014" ntp	0.9	Hydrophilic	3	Moderate
Abb Whisper medium support	Steel	Polymer	Core-to-tip	0.014" ntp	1.0	Hydrophilic	3	Moderate
Bic IQ	Nitinol	Spring coil	Shaping ribbon	0.014" ntp	1.1	Hydrophobic	2	Moderate
Abb Pilot 50	Steel	Polymer	Core-to-tip	0.014" ntp	1.5	Hydrophilic	3	Moderate
Abb Cross-IT 100XT	Steel	Spring coil	Core-to-tip	0.010" tp	1.7	Hydrophilic	3	Moderate
Abb Pilot 150	Steel	Polymer	Core-to-tip	0.014" ntp	2.7	Hydrophilic	3	Moderate
Bic PT 2 moderate support	Nitinol	Polymer	Shaping ribbon	0.014" ntp	2.9	Hydrophilic	2	Moderate
Mt Thunder	Steel	Spring coil	Core-to-tip	0.014" ntp	n/a	Hydrophilic	3	Extra
Mt Zieger support	Steel	Spring coil	Shaping ribbon	0.014" ntp	n/a	Hydrophilic	3	Extra
Asa Grand slave	Steel	Spring coil	Core-to-tip	0.014" ntp	0.7	Hydrophobic	4	Extra
Abb Balance heavy weight	Nitinol	Coil	Shaping ribbon	0.014" ntp	0.7	Hydrophilic	4.5	Extra
Bic Choice extra support	Steel	Spring coil	Core-to-tip	0.014" ntp	0.9	Hybrid†	2.8	Extra
Abb Powerman	Steel	Coil	Core-to-tip	0.014" ntp	0.9	Hydrophilic	3	Extra
Bic Choice PT extra support	Steel	Polymer	Core-to-tip	0.014" ntp	1.2	Hydrophilic	35	Extra
Abb Whisper extra support	Steel	Polymer	Core-to-tip	0.014" ntp	1.2	Hydrophilic	3	Extra

*Various alloys of steel, such as stainless steel, titanium, etc. are not specified.

†Hybrid distal 3 cm encoated

Abb: Abbott Laboratories, Abbott Park, Illinois, USA; Asa: Asahi Intec Co, Aichi, Japan; Bic: Boston Scientific Corp, Natick, Massachusetts, USA; Mt: Medtronic Inc, Minneapolis, Minnesota, USA; ntp: non-tapered; tp: tapered; †: inch.

Table 2 Detailed description of various, currently commercially available guidewires, dedicated for chronic total occlusions

Product	Core*	Tip	Design	Diameter	Tip load (g)	Tip coating	Radiopaque (cm)	Support	
Boc	Draco standard	Steel	Spring coil	Core-to-tip	0.014" rtp	n/a	Hydrophilic	2.8	Light
Abb	Whisper light support	Steel	Polymer	Core-to-tip	0.014" rtp	0.8	Hydrophilic	3	Light
Abb	Powerturn Ultraflex	Steel	Coil	Core-to-tip	0.014" rtp	0.9	Hydrophilic†	3	Light
Asa	Son	Steel	Coil	Core-to-tip	0.014" rtp	0.7	Hydrophilic	3	Moderate
Asa	Falckor XT	Steel	Polymer	Core-to-tip	0.009" sp	0.8	Hydrophilic	16	Moderate
Asa	Gaia First	Steel	Double coil	Core-to-tip	0.010" sp†	1.5	Hydrophilic	15	n/a
Asa	Miracle 3	Steel	Spring coil	Core-to-tip	0.014" rtp	3.0	Hydrophobic	11	Moderate
Asa	Ultimateflex 3	Steel	Spring coil	Core-to-tip	0.014" rtp	3.0	Hydrophilic	11	Moderate
Mt	Provia 3	Steel	Spring coil	Shaping ribbon	0.014" rtp	3.0	Hydrophobic	3	Moderate
Asa	Gaia Second	Steel	Double coil	Core-to-tip	0.011" sp†	3.5	Hydrophilic	15	n/a
Abb	Pilot 200	Steel	Polymer	Core-to-tip	0.014" rtp	4.1	Hydrophilic	3	Moderate
Asa	Miracle 4.5	Steel	Spring coil	Core-to-tip	0.014" rtp	4.5	Hydrophobic	11	Moderate
Abb	Cross-IT 200KT	Steel	Spring coil	Core-to-tip	0.010" sp	4.7	Hydrophilic	3	Moderate
Abb	Progress 40	Steel	Spring coil	Core-to-tip	0.012" rtp	4.8	Hydrophobic	3	Moderate
Mt	Provia 6	Steel	Spring coil	Shaping ribbon	0.014" rtp	6.0	Hydrophobic	3	Moderate
Asa	Miracle 6	Steel	Spring coil	Core-to-tip	0.014" rtp	6.0	Hydrophobic	11	Moderate
Abb	Cross-IT 300KT	Steel	Coil	Core-to-tip	0.010" sp	6.2	Hydrophilic	3	Moderate
Abb	Cross-IT 400KT	Steel	Coil	Core-to-tip	0.010" sp	6.7	Hydrophilic	3	Moderate
Asa	Confianza Pro	Steel	Spring coil	Core-to-tip	0.009" sp	9.0	Hydrophobic	20	Moderate
Mt	Provia 9	Steel	Spring coil	Shaping ribbon	0.009" sp	9.0	Hydrophobic	3	Moderate
Abb	Progress 80	Steel	Coil	Core-to-tip	0.012" rtp	9.7	Hydrophobic	3	Moderate
Asa	Confianza Pro 12	Steel	Spring coil	Core-to-tip	0.009" sp	12.0	Hydrophobic	20	Moderate
Asa	Miracle 12	Steel	Spring coil	Core-to-tip	0.014" rtp	12.0	Hydrophobic	11	Moderate
Abb	Progress 140T	Steel	Coil	Core-to-tip	0.010" sp	12.5	Hydrophobic	3	Moderate
Abb	Progress 200T	Steel	Coil	Core-to-tip	0.009" sp	13.3	Hydrophobic	3	Moderate
Abb	Progress 120	Steel	Coil	Core-to-tip	0.010" rtp	13.9	Hydrophobic	3	Moderate
Mt	Provia 12	Steel	Spring coil	Shaping ribbon	0.009" sp	12.0	Hydrophobic	3	Extra
Mt	Provia 15	Steel	Spring coil	Shaping ribbon	0.009" sp	15.0	Hydrophobic	3	Extra

*Various alloys of steel, such as stainless steel, titanium, etc. are not specified.

†Hydrophilic, except very distal tip.

‡Exposed with straight segment at the distal 15 mm (Gaia First) or 6 mm (Gaia Second).

Abb, Abbott Laboratories, Abbott Park, Illinois, USA; Asa, Asahi Intec Co, Aichi, Japan; Boc, Boston Scientific Corp, Marlborough, Massachusetts, USA; Mt, Medtronic Inc, Minneapolis, Minnesota, USA; rtp, non-exposed, tip tapered; sp, inch.

ASAHI SION



First choice guide wire with a flexible shaft and full hydrophilic coating, recommended for tortuous vessels and side branches.

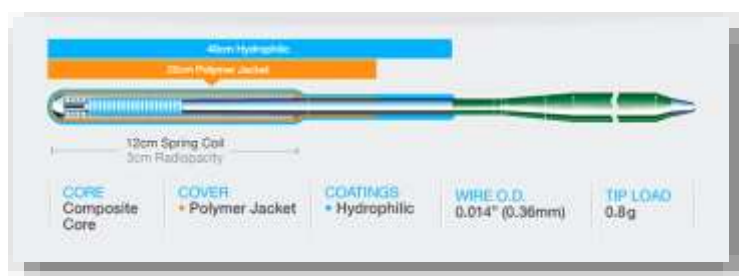
ASAHI SION BLUE



Frontline guide wire with great tip flexibility and support for a safer procedure up to the stent delivery.



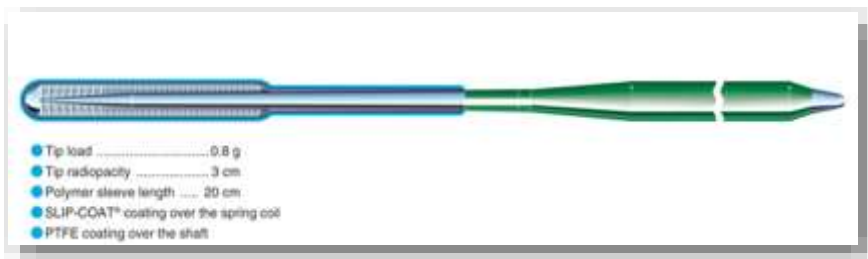
ASAHI SION BLACK



Frontline guide wire with a polymer jacket designed to retain flexibility while crossing high resistance stenosis and vessels.



ASAHI fielder FC



Fine control over challenging tortuous vessels and highly stenosed lesions. Polymer sleeve provides advanced slip performance with superior torque and support.



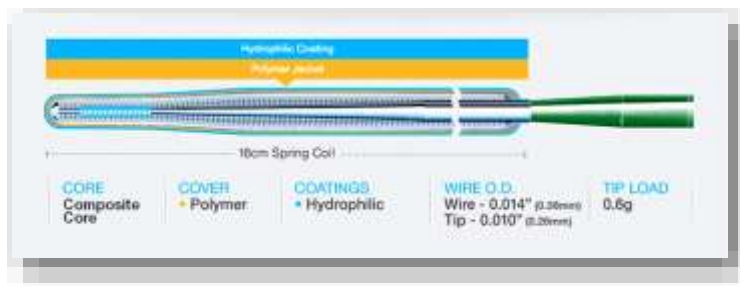
ASAHI fielder XT



Is a polymer sleeve covered wire providing excellent lubricity and trackability in tortuous vessels. The tapered tip provides extreme precision for the treatment of complex lesions such as sub-total occlusions and long diffused lesions.



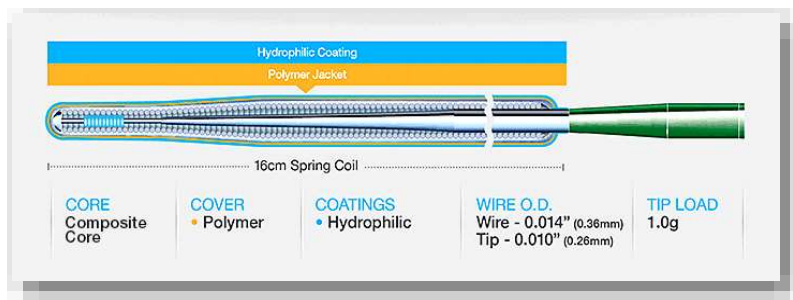
ASAHI Fielder XT-R



Guide wire recommended for narrow channel tracking with its low profile, flexible tip, and high lubricity polymer coating.



ASAHI Fielder XT-A



Guide wire with a higher tip load than Fielder XT-R, facilitating entry into the chronic occluded lesion.



Beyond *Fielder XT*

Extreme Precision for Complex Lesions

Fielder XT + Composite Core → Fielder XT:A (Crossability)
Fielder XT + Composite Core → Fielder XT:R (Trackability)

Tapered type Polymer jacket

Tissue resistance

44th Annual International Congress of the
EGYPTIAN SOCIETY OF CARDIOLOGY
CardioEgypt2017

ASAHI Miracle Family

CORE Core-to-tip	COVER None	COATINGS • Hydrophobic	WIRE O.D. 0.014" (0.36mm)
11cm Spring Coil 11cm Radiopacity		TIP LOAD 3.0g / 4.5g / 6.0g / 12.0g	

44th Annual International Congress of the
EGYPTIAN SOCIETY OF CARDIOLOGY
CardioEgypt2017


Wire O.D.
0.014"

Wire O.D.
0.014"

Wrap-up with surveillance


ASAHI
Gaia
PTCA GUIDE WIRE

Not difficult but different



The image shows a long, thin, flexible guide wire with a curved tip. The wire is shown in a light blue color with a darker blue tip. The text 'ASAHI Gaia PTCA GUIDE WIRE' is positioned to the left of the wire, and the slogan 'Not difficult but different' is below it.

44 The 44th Annual International Congress of the
EGYPTIAN SOCIETY OF
CARDIOLOGY
CardioEgypt2017



ASAHI Gaia Family

ASAHI Gaia First



The diagram shows a cross-section of the ASAHI Gaia First guide wire. It features a 15cm coil length, a 40cm hydrophilic coating, and a PTFE coating on the tip. The total length is 190cm, and it is J-tipped.

CORE	COVER	COATINGS	WIRE O.D.	TIP LOAD
Composite Core	None	Hydrophilic 40cm	Wire - 0.014" (0.36mm) Tip - 0.010" (0.25mm)	1.7g

Guide wires with a high manoeuvrability in the chronic occluded lesion, and a tip designed to improve penetrability into the lesion while remaining flexible.

44 The 44th Annual International Congress of the
EGYPTIAN SOCIETY OF
CARDIOLOGY
CardioEgypt2017



ASAHI Gaia second



ASAHI Gaia third



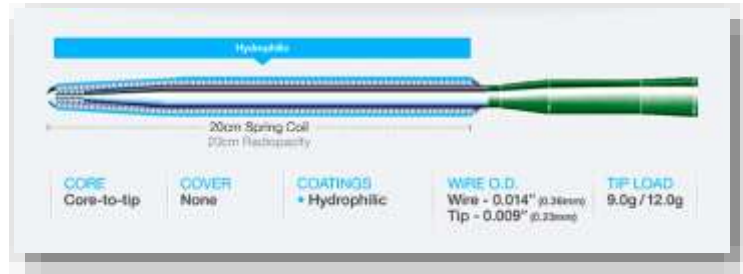


ASAHI Gaia concept for Chronic Occlusion

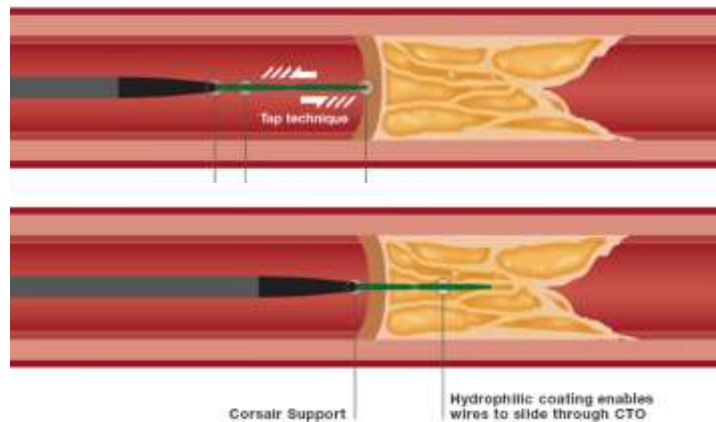
- Smooth entry into the occluded lesion
 - Gaia micro-cone tip
- Easy control within the lesion
 - Composite core
- Maintains shaping memory within the lesion
 - Thin - Mini-pro shape

The 44th Annual International Congress of the
EGYPTIAN SOCIETY OF
CARDIOLOGY
CardioEgypt2017

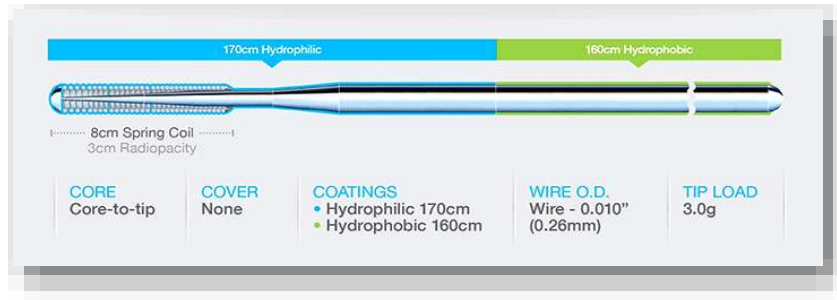
ASAHI CONFIANZA PRO



A tapered tip guide wire available in 9gf and 12gf Tip loads. For penetration of calcification and proximal or distal thick, fibrous caps. The distal tip is not coated to allow it to catch on the entry point of the lesion.



ASAHI RG3



For guide wire externalization only.



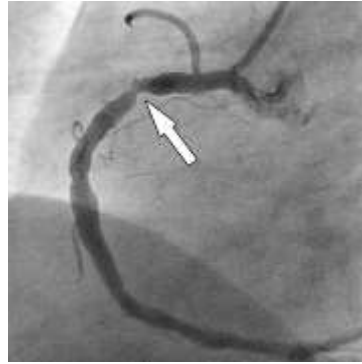
Which wire for which lesion?

- **It depends on:**
 - Vessel anatomy (tortuous, Angulated, ...)
 - Lesion morphology (simple lesion, subtotal occlusion, CTO,
 - The device to be used (balloon, stent, IVUS, rotablator,..)
 - Operators experience and preferences



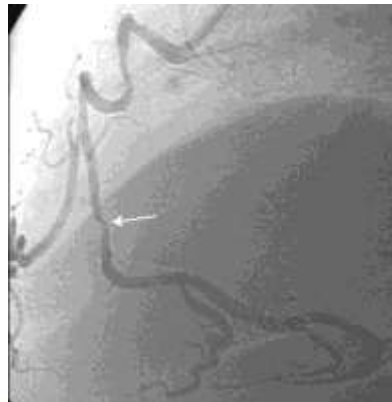
Simple lesions (Workhorse wire)

- Short, concentric stenoses in the presence of a straightforward anatomy.
- Safe wire (atraumatic tip)
- Favourable torquability and trackability.
 - **BMW, Choice floppy, ASAHI soft,**



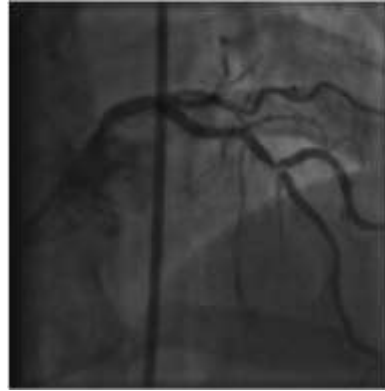
Tortuous anatomy

- In the case of severe tortuosity the emphasis needs to be placed on flexibility, lubricity and excellent trackability.
- The best choice might be a wire with a polymer/hydrophilic cover.
- Soft tip is more favourable, since the risk of vessel injury over multiple bends is increased with a stiffer tip.
- Therefore our first choice for such anatomy would be the **BMW, the IQ, the CHOICE Floppy, the Whisper MS or the Pilot 50.**



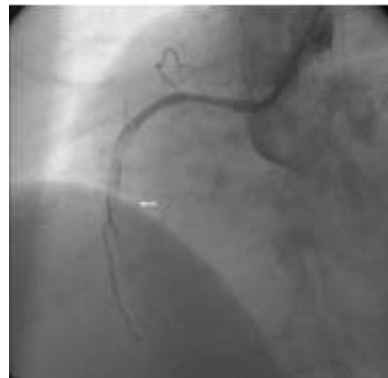
Bifurcations

- Jailed Wires; attention in jailing polymer covered wire due to risk of stripping the cover during retrieval..
- Recrossing the stent struts to enter a jailed branch needs a floppy and slippery wire with good torquability and trackability.
- Choice for bifurcation can be BMW, the IQ, the ChoICE Floppy, Choice PT the Whisper MS, the Pilot 50, Whisper ES



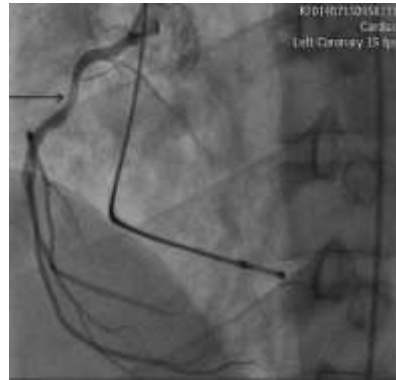
Acute or recent thrombotic occlusions

- **BMW, IQ, or the ChoICE Floppy workhorse wires usually successful.**
- Hydrophilic wires with a higher tip load (**Whisper MS or the Pilot 50**) may slightly increase the risk of subintimal dissection, although their use may be favourable when occlusion occurs within a tight stenosis or tortuous coronary segment



Wires in coronary dissection

- Usually floppy, coiled tip workhorse wire succeed bypass the dissection and navigate to the true lumen (**BMW, IQ and choice floppy**).
- Avoid the polymer covered slippery wires because they tend to go through the sub-intimal plane.



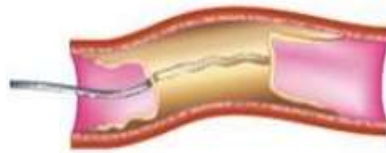
Wires in CTO

- *Dedicated CTO guidewires.*
- *Anterograde approach:*



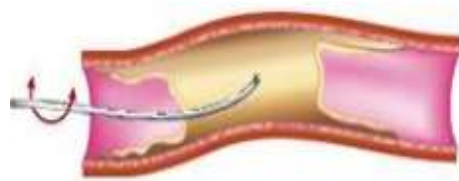
Sliding

- Micro-channels
- CTO < 6 month
- STAR technique
- Hydrophilic coated and polymer covered wires
- **Fielder, Fielder XT, Fielder FC**
- **Whisper, Pilot 50, and Choice PT**



Controlled drilling

- CTO with discrete entry point after failure of initial attempt with soft (intermediated wire)
- Stiff, hydrophobic non tapered wires,
- **Miracles / Miraclebros**



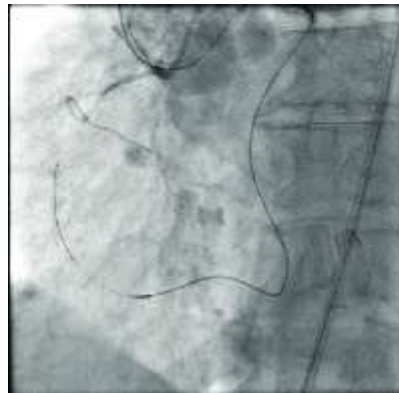
Penetration

- Blunt entry point
- Heavy calcific or resistant lesions
- Alternative to drilling as workhorse technique after failure of initial soft wire
- Superstiff tapered wires:
- **Conquest /confianza (9 g, 12 g)**
- **Cross it XT 400**
- **MircalesBros 12**



Retrograde approach

- *Collateral crossing:*
- Soft polymer coated wires either tapered, such as **Fielder XT-R**, or non-tapered, such as **Sion black** wire or **Whisper LS**.
- Attacking Among the most frequently used retrograde wires are **Miraclebros 3**, **Gaia 1** and **Gaia 2** over the closely positioned microcatheter.
- Wire Externalizations:
ASAHI RG3, **Prowater Flex**



Complication of guidewires

- Dissection
- Perforation
- Wire fracture
- Tip entrapment



Take home message

- A lot of available guidewires with variable characters and specifications.
- Improper choice of guidewire may not only prolong the procedure, but also compromise its success.
- Operators therefore need to be aware of the most basic properties and technical background of guidewires, and be familiar (by hands and mind) with at least half a dozen of them.



Thank you

