

How to Remove a Pressure Products SafeSheath® Worley Telescopic LVI and/or SafeSheath® CSG® Worley Without Displacing the LV Pacing Lead

Once the LV pacing lead is in place with satisfactory pacing thresholds and no phrenic or diaphragmatic pacing the telescopic guide and/or sheath must be removed without dislodging the lead.

When using over the wire pacing leads, remove the angioplasty wire and replace it with a soft stylet to stabilize the lead during guide/sheath removal.

If the guide/sheath is removed with the angioplasty wire in place, friction between the guide/sheath and the pacing lead will slide the lead back over the wire as shown in Figure 1.

The Worley Telescopic Guide supports the lead in the target vein while the angioplasty wire is removed and the stylet is advanced as shown in Figure 2.

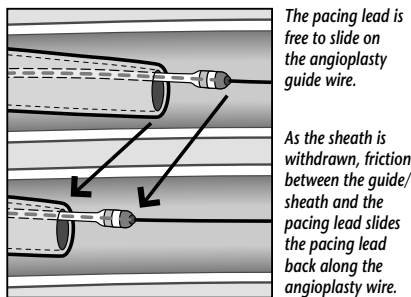


Figure 1 Friction between the sheath and pacing lead slides the pacing lead back over the angioplasty wire as the sheath is withdrawn.

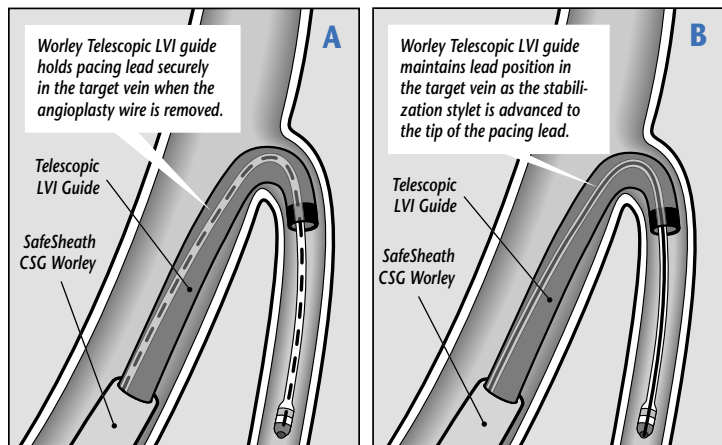


Figure 2 The Worley Telescopic LVI supports the lead in the target vein while the angioplasty wire is removed and the stabilization stylet is advanced to the tip of the lead.

Before inserting the stabilizing stylet, gently curve the distal 8-10cm of the stylet similar to the curve on the SafeSheath CSG Worley STD. The importance of a soft curved stylet becomes apparent once the Telescopic Guide and sheath are removed, as shown in Figure 13.

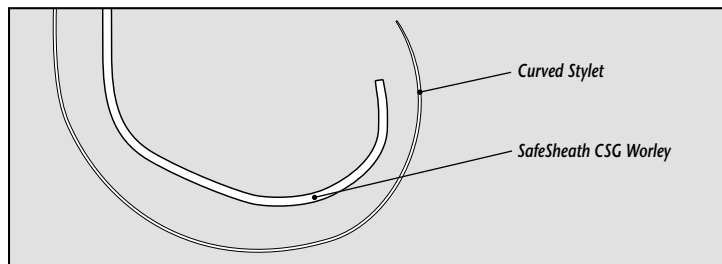


Figure 3 Stabilization stylet is formed by curving the distal 10cm of a soft stylet to resemble a SafeSheath CSG Worley.

Always advance the stylet to the tip of the pacing lead. If the stylet is not at the tip of the lead, friction between the guide/sheath and pacing lead will slide the lead back over the stylet as shown in Figure 4. If the stylet is at the tip, the lead position will remain constant as long as the position of the stylet is fixed as shown in Figure 5.

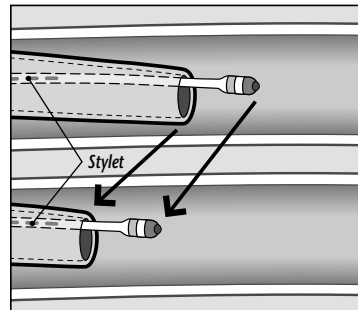


Figure 4 When the stylet is not advanced to the tip of the pacing lead, friction between the guide/sheath and the pacing lead will slide the lead back over the stylet as the sheath is withdrawn even when the position of the stylet is fixed.

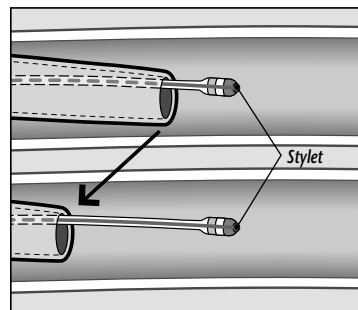


Figure 5 When the stylet is at the tip of the pacing lead, friction between the sheath and the pacing lead will not slide the lead back over the stylet as the sheath is withdrawn as long as the position of the stylet is fixed. The Worley Telescopic Guide provide support to insure that advancing the stylet does not displace the lead

Don't leave the stylet at the mid CS level. Advance the stylet all the way to the tip of the lead. Remember, the Worley Telescopic Guide supports the lead so the stylet can be advanced to the tip of the lead without fear of displacing the lead from the target vein. Once the stabilizing stylet is in place, the Telescopic Guide is cut away.

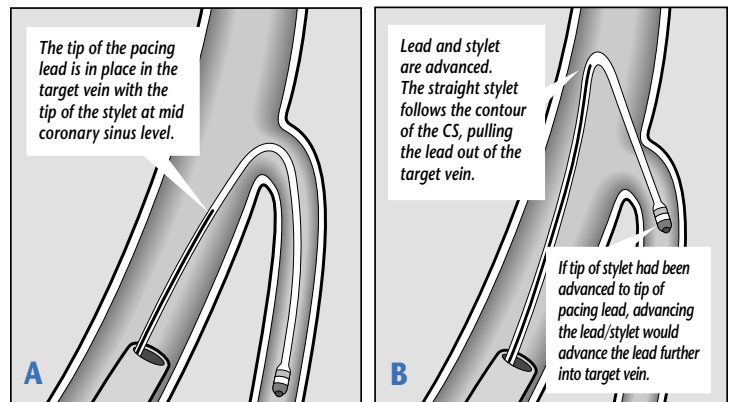


Figure 6 If the stylet is left at mid CS level and the Telescopic Guide removed inadvertently advancing the lead and/or stylet will displace the tip of the lead from the target vein.

In Panel A, the stabilization stylet was not advanced to the tip of the LV pacing lead before the Telescopic Guide was removed.

In Panel B, if the lead and/or stylet is advanced in the process of removing either the Telescopic Guide or the sheath, the tip of the lead will be displaced from the target vein. If the stylet were advanced to the tip of the lead before the Telescopic Guide were removed, advancing the lead/stylet during removal of the guide/sheath would likely advance the lead further into the target vein rather than displacing the tip.

Once the stabilization stylet is at the tip of the LV pacing lead, the Telescopic Guide can be removed. Before removing the LVI, be certain the SafeSheath CSG Worley is at mid CS level. The tip of the CSG sheath must be at mid CS level to straighten and support the Telescopic Guide, stabilizing the lead as the LVI is removed. If the CSG is not securely in the CS, removal of the Telescopic Guide may displace the lead as it falls out of the CS unsupported.

Once it is clear that the tip of the CSG is in the CS, an assistant grasps the CSG sheath distal to the CSG hub in order to maintain stability as the Telescopic Guide is cut away. The hemostatic hub of the LVI is cracked and a Cutter is used to remove the Telescopic Guide (see Figure 7). As the LVI is cut away, the sheath maintains CS access and helps support the lead.

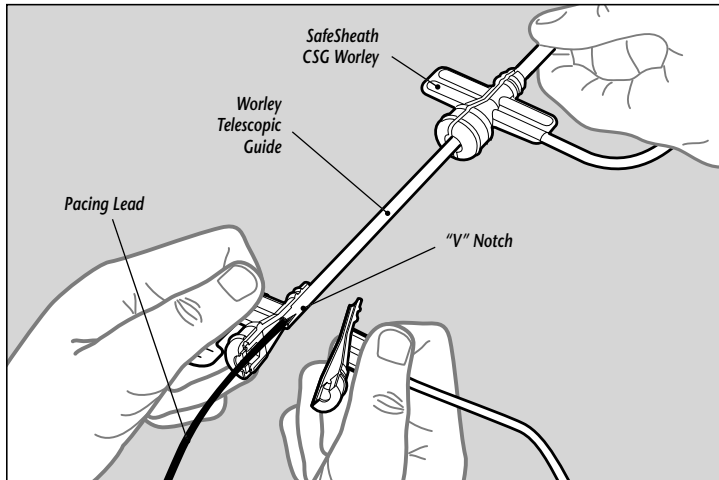


Figure 7 Cutting the Worley Braided Telescopic Guide. The assistant holds the SafeSheath CSG Worley in position at mid CS level. The operator breaks the hemostatic valve. Half of the hub remains attached to the Telescopic Guide as a handle for cutting, enabling removal of the LVI without the need to slice through the hub.

Position the distal "C" section of the Cutter under the Telescopic Guide distal to the LVI hub as shown in Figure 8. Insert the Cutter blade hook into the "V" notch (see Figure 7) of the tubing at the proximal end of the Telescopic Guide as shown below.

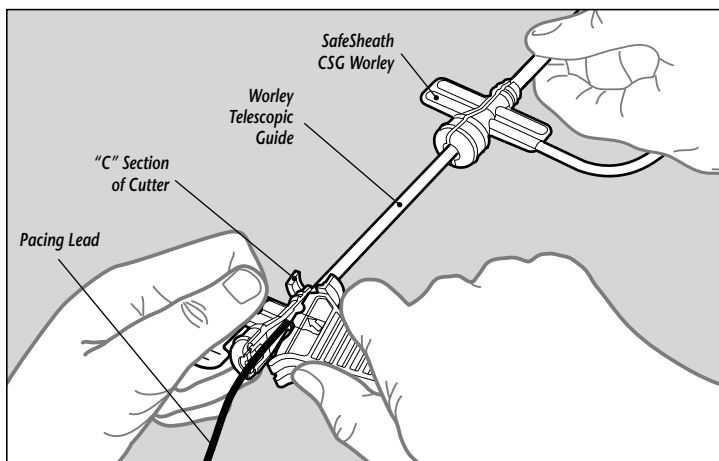


Figure 8 Preparing to cut the Worley Braided Telescopic Guide

While holding the pacing lead, Telescopic Guide and CSG Worley in position, cut the LVI by advancing the Cutter toward the SafeSheath CSG (see Figure 9) until the distal "C" portion of the Cutter engages the CSG hub. Make sure the pacing lead, Telescopic Guide and CSG Worley are not advanced or withdrawn with the Cutter during this part of the procedure.

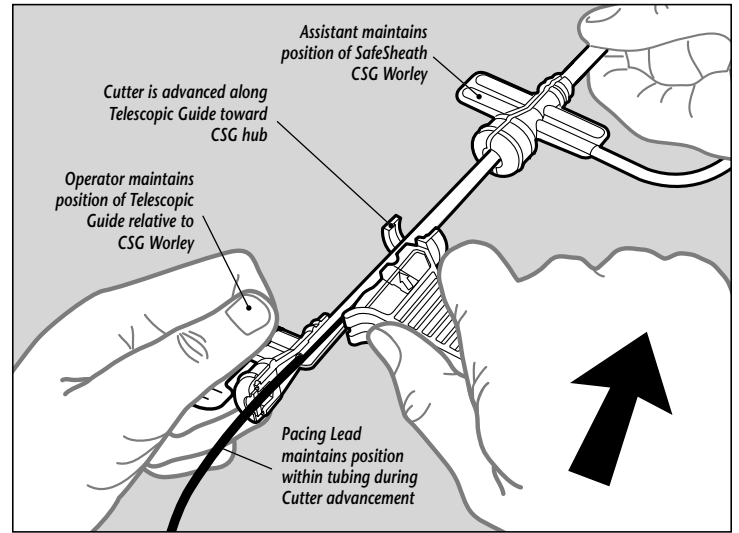


Figure 9 The Worley Braided Telescopic Guide is cut by advancing the Cutter along the LVI tubing toward the CSG hub while making sure to maintain position of CSG Worley, Telescopic Guide and Pacing Lead

After the Cutter has engaged the CSG hub, thread the lead over the notch at the back of the Cutter. Compress the lead between your thumb and the Cutter as shown in Figure 10. While keeping the lead and Cutter engaged with the CSG hub with one hand, slowly withdraw the Telescopic Guide over the Cutter blade with the other hand. As the Telescopic Guide is withdrawn it is cut away from the lead in the process. Make sure the assistant continues to hold the SafeSheath CSG Worley distal to the hub, maintaining its position in the mid CS during cutting and removal of the LVI Guide. The peel-away SafeSheath CSG Worley continues to provide CS access and stability for the pacing lead during the LVI Guide cutting procedure.

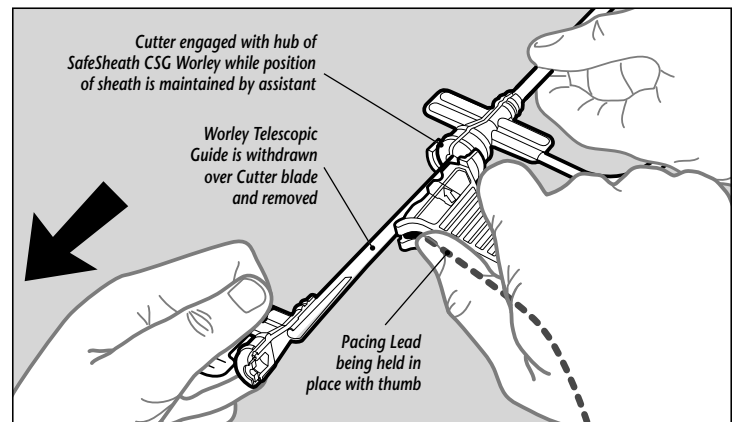


Figure 10 Removing the Worley Braided Telescopic Guide.

The peel-away SafeSheath CSG Worley can now be removed. Before starting, remember that additional lead length may be required once the sheath is removed, as shown in Figure 11.

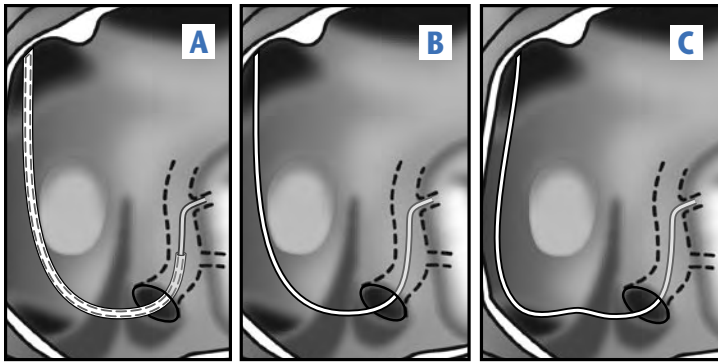


Figure 11 More lead length is needed once the sheath is removed.

In Panel A, the lead is in place in the target vein. The lead is contained within the sheath between the skin and the proximal coronary sinus. The path of the sheath thus determines the length of the lead required between the pocket and coronary sinus.

In Panel B, when the sheath is removed without advancing additional lead, the pacing lead is usually on stretch which may displace the tip of the lead from the target vein.

In Panel C, additional slack has been added to insure that the tip of the lead is not dislodged when the patient breathes or stands up. As the sheath is withdrawn from the coronary sinus to the superior vena cava, it is wise to advance the lead to avoid the situation in Panel B.

With the realization that additional lead length may be required as the sheath is withdrawn, the operator will want to withdraw the sheath under fluoroscopy in a careful and controlled manner, adding additional lead as required. This is best accomplished by following the directions illustrated in Figures 12-15. Before cracking the hemostatic hub of the SafeSheath CSG Worley, withdraw the sheath over the pacing lead to the IS-1 connector. As the sheath is withdrawn both the atrial portion and tip of the LV lead should be in the fluoroscopic field to judge the length of lead required as the supporting sheath is removed. The approach illustrated in Figures 12-15 also minimizes blood loss and the risk of air embolization because the hemostatic hub is not broken until it is withdrawn to the IS-1 connector. Pinching the lead between the walls of the sheath reduces the bleeding and air embolization once the valve is cracked.

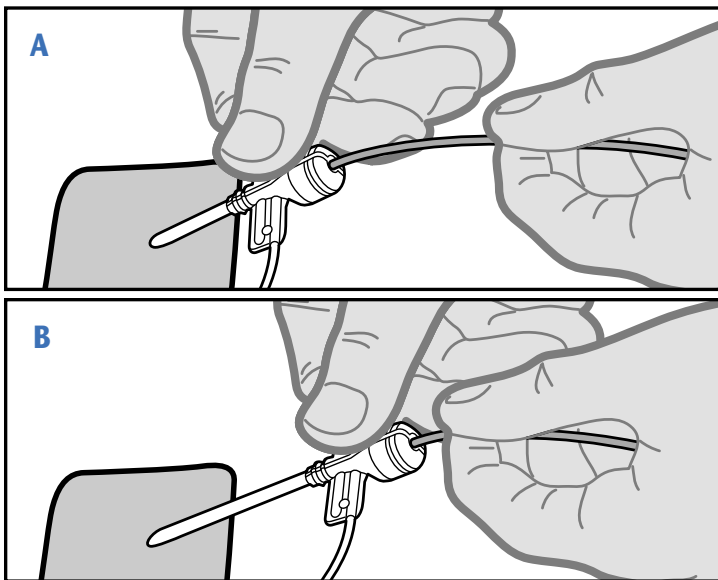


Figure 12 Withdrawing the SafeSheath CSG Worley over the LV pacing lead before cracking the hemostatic valve. As the sheath is withdrawn, the slack on the lead can be adjusted.

In Panel A, the left hand is fixed in place and the right hand of the operator draws the sheath back to the left hand.

In Panel B, the lead with stylet in place is grasped with left hand 5cm from the black hemostatic hub of the sheath. The right wing of the break-away hemostatic valve is grasped with right hand.

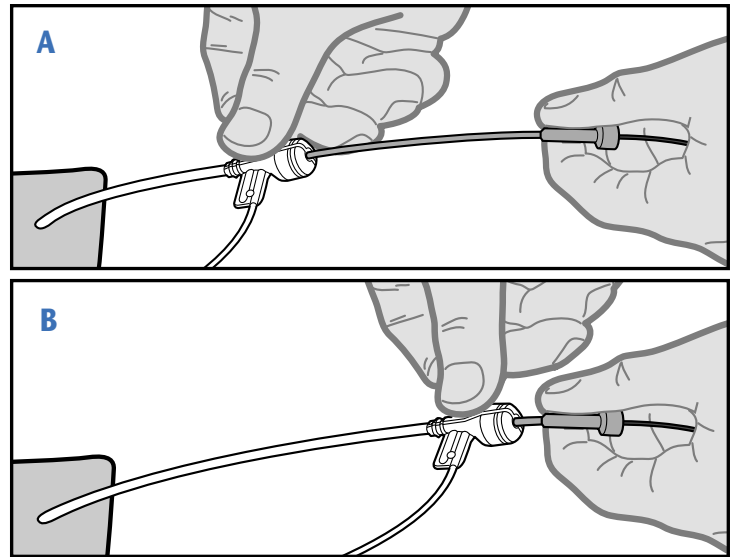


Figure 13 Continued withdrawal of the SafeSheath CSG Worley to the IS-1 connector before cracking the hemostatic valve. As the sheath is withdrawn, the slack on the lead can be adjusted.

In Panel A, the lead is fixed 5cm from the hemostatic valve with left hand. The right hand grasps wing of hemostatic valve and pulls sheath toward the left hand, withdrawing the sheath from the CS and into the RA.

In Panel B, the sheath has been withdrawn to the IS-1 connector. The tip of sheath is now in the SVC where inadvertent motion is not likely to cause the LV lead to be displaced.

When the hemostatic hub reaches the IS-1 connector, have an assistant pinch the pacing lead firmly between the walls of the SafeSheath CSG Worley where it exits the body in the pacemaker pocket.

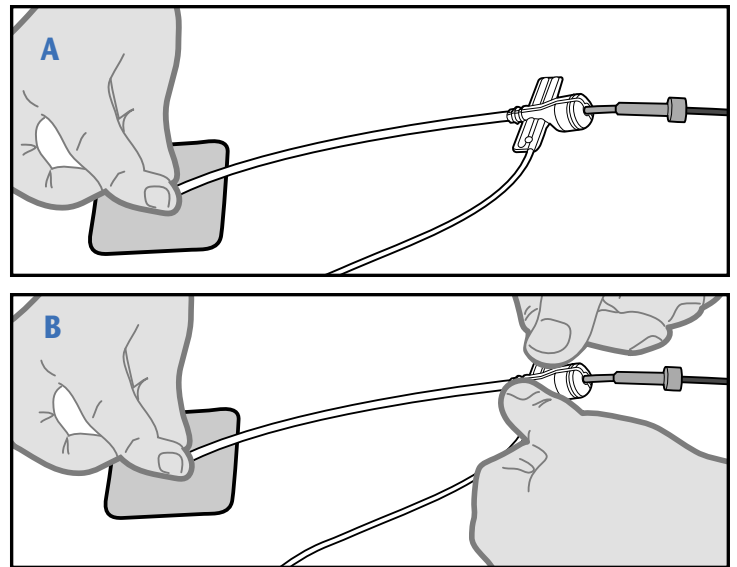


Figure 14 Stabilizing the LV pacing lead and SafeSheath CSG Worley prior to cracking the hemostatic valve.

In Panel A, the assistant pinches the lead between the walls of the sheath.

In Panel B, with the assistant stabilizing the LV lead and sheath, the operator grasps the wings to crack the hemostatic valve.

With the lead and sheath both stabilized by the assistant, the hemostatic valve is cracked and the sheath peeled down to the assistants fingers.

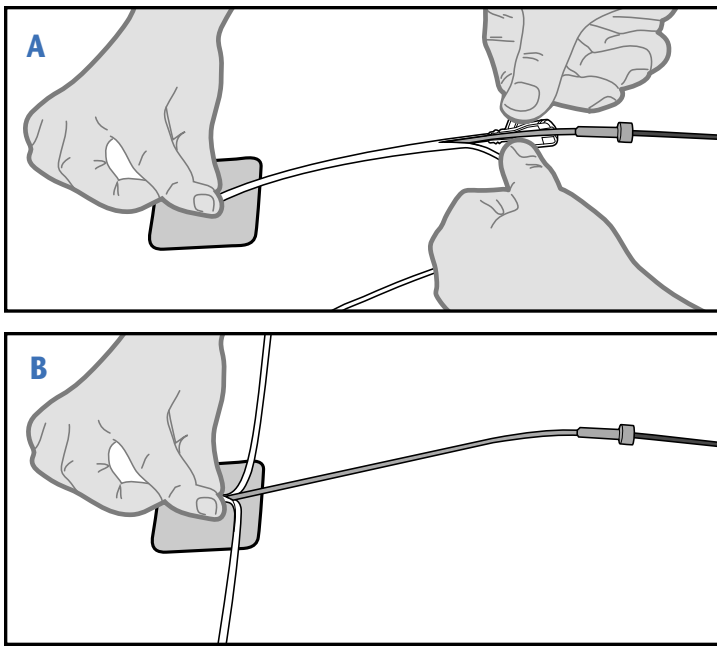


Figure 15 Peeling the stabilized SafeSheath CSG Worley.

In Panel A, the valve has been split and the peeling has started.

In Panel B, the sheath is peeled rapidly down to the fingers of the assistant who continues to pinch the lead between the walls of the sheath. Pinching the lead between the walls of the sheath not only stabilizes the sheath and LV lead, it also reduces bleeding and the risk of air embolization.

After the assistant releases the sheath/lead, the rest of the sheath is drawn back over the lead while watching under fluoroscopy.

As the tip of the sheath exits the body and the pacing lead becomes visible, the assistant secures the lead position with his or her fingers in the pocket.

The final step is to remove the stylet. Many a successful implant has been lost at this step so it is important to be careful. There are two issues of importance; the characteristics of the stylet and how the stylet is withdrawn.

Stylet Characteristics

In Figure 3 it was advised that a soft gently curved stylet be advanced to the tip of the lead. Figure 13 illustrates what can happen if a stiff straight stylet is used.

How the Stylet is Withdrawn

The stylet should be removed quickly (similar to pulling the cord on a lawn mower) to avoid displacing the lead from the target vein. Rapid removal minimizes the time the stylet will have to displace the lead as it is withdrawn from the CS through the RA.

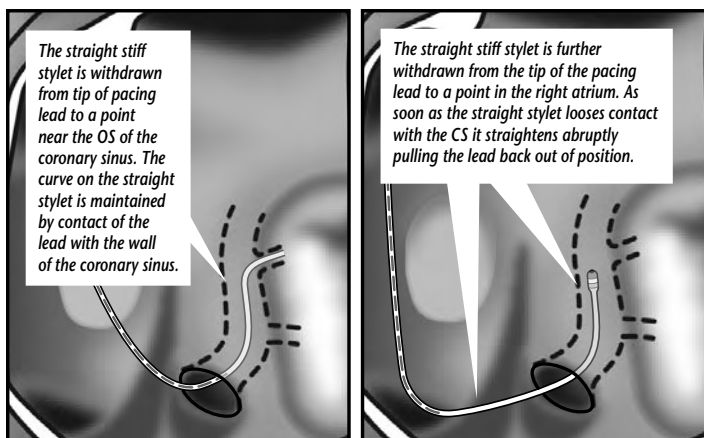


Figure 13 Once the Telescopic Guide and Sheath have been removed, a straight stiff stylet dislodges the pacing lead as it is withdrawn from the coronary sinus into the right atrium.

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