## Wolff-Parkinson-White Syndrome

In Wolff-Parkinson-White (WPW) syndrome there is an additional pathway for electrical activity to travel between the atria and the ventricles. Additional pathways are referred to as 'accessory pathways'; in the case of WPW syndrome the pathway is known as the bundle of Kent.[31] This accessory pathway allows electrical activity to bypass the AV node and move directly between the top and bottom of the heart through the atrioventricular septum (Figure 2.1). The most common location for the accessory pathway is within the fibrous tissue surrounding the mitral or tricuspid valves. Unlike the AV node, accessory pathways have no ability to control the rate of their electrical conduction; this is what can lead to tachycardias developing.

The accessory pathway may allow electrical activity to travel in both directions. When travelling from the atria to the ventricles, this causes an area of ventricular muscle to depolarise prematurely. A re-entrant pathway is present if electrical activity can travel 'up' from the ventricles into the atria. This can lead to a re-entrant tachycardia (page XXX).[16, 31]

When residing in sinus rhythm, the only clue to the presence of an accessory pathway is the presence of a delta wave, seen at the beginning of the QRS complex. This delta wave occurs due to early depolarisation of a portion of the ventricles as electrical activity moves through the accessory pathway from the atria. This majority of the ventricular muscle depolarises normally as the electrical activity passes through the AV node, the delta wave ends as the normal depolarisation takes over and the R wave sharply increases its angle and amplitude. This makes the QRS complex a fusion beat between the normal depolarisation and the depolarisation from the accessory pathway.[16]

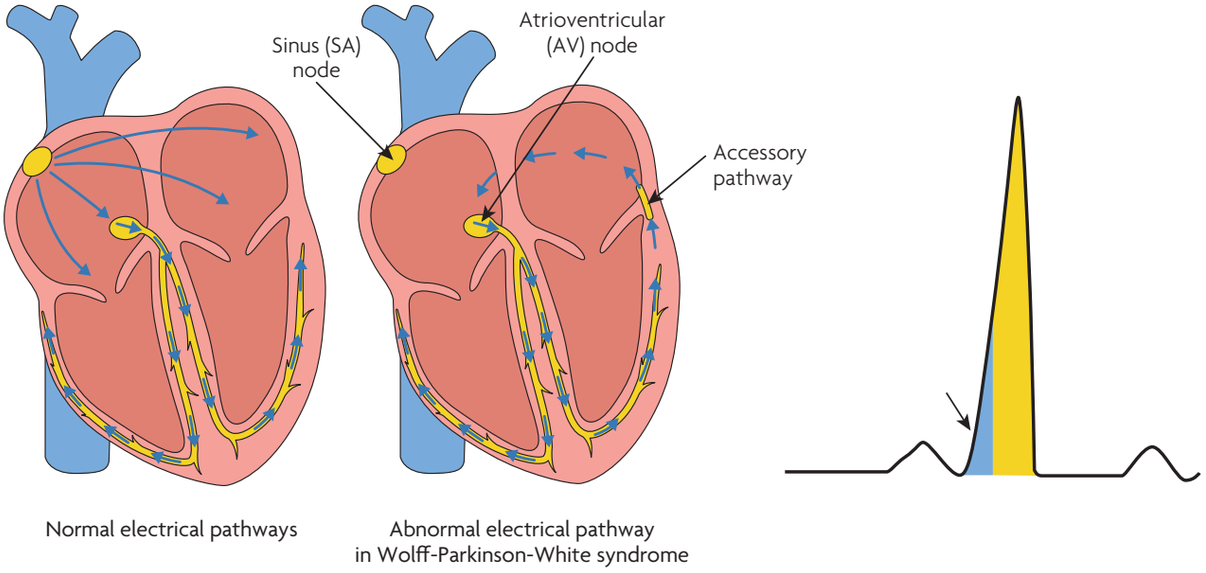


**Figure 2.1** Normal conduction pathway (left) and accessory pathway causing pre-excitation and re-entry (right).

### ECG Identification of Wolff-Parkinson-White Syndrome[16, 17, 31]

- A delta wave is present in the initial phase of the QRS complex. It is seen as a widening and slurring of the first upstroke of the R wave.
- This causes the QRS to be wide, greater than 0.10 seconds.
- A short PR interval will also be present.
- There may also be an increased QRS complex amplitude, T wave abnormalities and Q waves. These are caused by the fusion beat between the accessory pathway and normal depolarisation.



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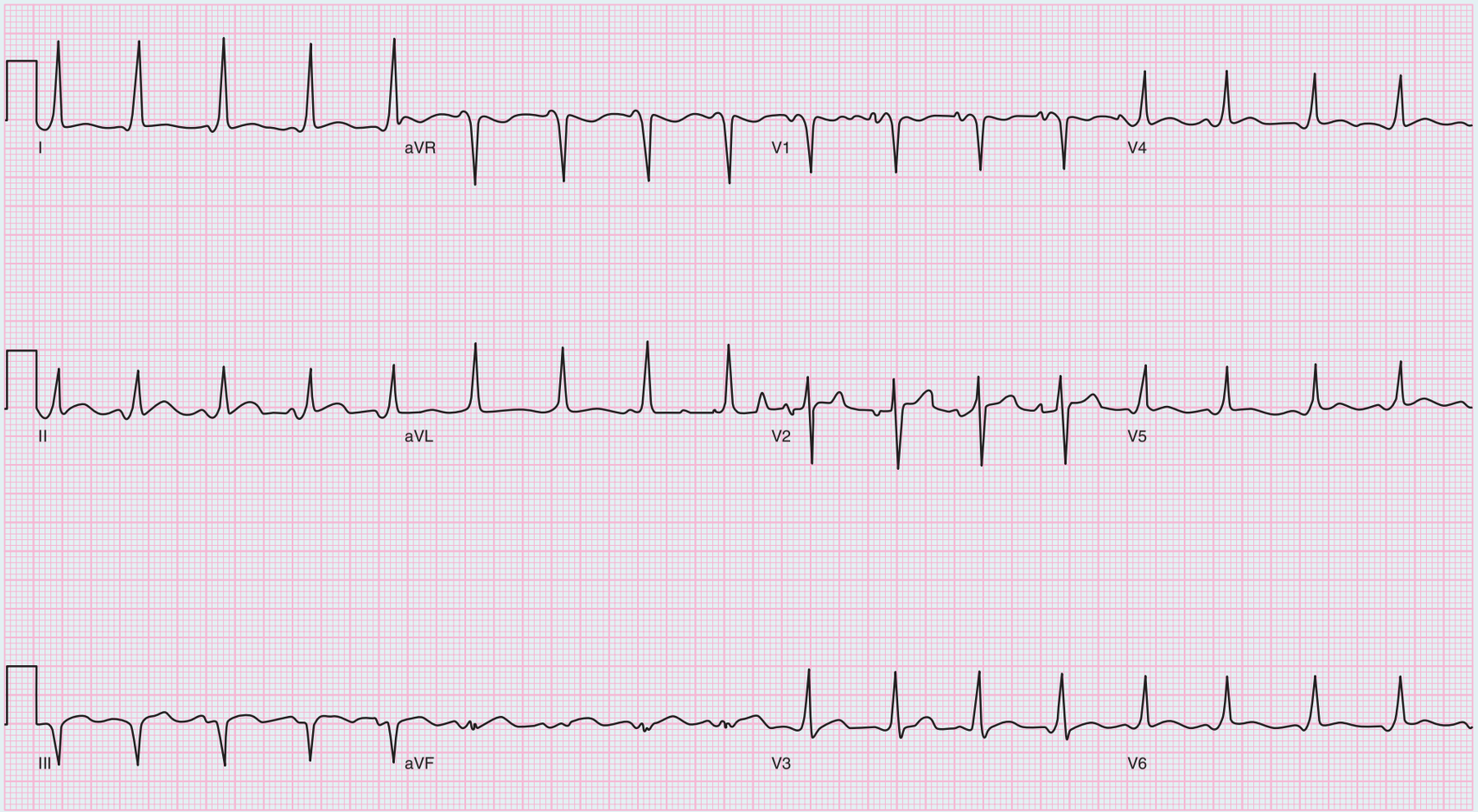
## ECG 2.6a – Wolff-Parkinson-White syndrome




Initially, this ECG may appear normal, but on closer inspection we can see it meets the criteria for WPW syndrome. The QRS complexes are on the wider side of normal, at around 0.11 seconds. The delta waves can be difficult to spot in some lead views. They can be seen in leads I and II, but they are most clearly seen in leads V4, V5 and V6. There is also a short PR interval.





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