Since 6 is not in *Cons* (2,3), and 6 $\wedge$ 2 and 6 $\wedge$ 3, Property 4 implies that there is a single staircase path K from 6 to the 2 and 3 dent lines of *Cons* (2,3), and passing through *Cons* (2,3). Since the 1 dent line of *Cons* (1,2) is in *Cons* (2,3), (see Figure 13 (a)), K intersects the 1 dent line of *Cons* (1,2), implying that 6 $\wedge$ 1. But <6,1> is a cycle edge of H^c, a contradiction.

Q.E.D.

8. An $O(n^3)$ Algorithm for Polygons with Three Dent Orientations

In this section, we show that if P has only three dent orientations, then the star graph H is triangulated [9, 15]. This would give us an $O(n^3)$ algorithm for finding the star cover for P.

Definition 5. [9, 15] A graph is said to be triangulated (or chordal) if it contains no induced cycles of length greater than three.

In general, the star graph H is not triangulated: there exist induced 4 cycles in H (see Figure 14). For the case where P has only three dent orientations, H is triangulated, as the following theorem shows.

Theorem 5. The star graph H of an orthogonal polygon with at most three dent orientations is triangulated.

Proof: By Lemma 12, we have that H does not contain induced cycles of length greater than four. It now suffices to show that H cannot have an induced 4 cycle.

Assume to the contrary that <1,2>, <2,3>, <3,4> and <4,1> is an induced 4 cycle in H. Since <1,3> is not present, $1 \not\wedge 3$. Consider *Cons* (1,3). Neither 2 nor 4 is in *Cons* (1,3), else by Lemma 9, 2 $\wedge$ 4. This also implies that *Cons* (1,3) is not of type III.

If *Cons* (1,3) is of type II, then by Lemma 11, 2 $\wedge$ 4, a contradiction.

Thus, *Cons* (1,3) is a type I constriction. Without loss of generality, let the two dent lines be vertical and let the 1 dent line be to the west of the 3 dent line (see Figure 15 (a)). By Property 2, we have established the presence of an E dent and a W dent.

Without loss of generality, let 2 be on the same side of *Cons* (1,3) as 1. By Property 4, there is a staircase L (southeast, say) from 2 to 2″ on the 3 dent line, intersecting the 1 dent line at 2′. 2 sees every point below 2′ on the 1 dent line and every point below 2″ on the 3 dent line.

Case 1: Let 4 be on the same side of *Cons* (1,3) as 1.
Then, every staircase from 4 to 4″ on the 3 dent line, and hence to 4′ on the 1 dent line,