

CLAIMS

1. A needle comprising:

a body having a longitudinal dimension with a proximal end and a distal end; a lumen extending between said proximal end and said distal end, a first longitudinal side surface, a second longitudinal side surface opposite said first longitudinal side surface;

a first bevel surface extending at an angle of 12-22° with respect to the longitudinal dimension from said first longitudinal side surface to said second longitudinal side surface to form a distal tip, a second reverse bevel surface, and a third reverse bevel surface on a peripheral surface at said second longitudinal side surface and converging to a distal tip and said first bevel surface, said second reverse bevel surface and third reverse bevel surface being oriented relative to said first bevel surface to define a first cutting edge between said second reverse bevel surface and said first bevel surface, and a second cutting edge between said third reverse bevel surface and said first bevel surface, and a longitudinal distal cutting edge between said second reverse bevel surface and said third reverse bevel surface, where a length of said first cutting edge between said second reverse bevel surface and said first bevel surface and a length of said second cutting edge between said third reverse bevel surface and said first bevel surface is ~~about~~ 1/3 to 1/2 a length of said first bevel surface, and said first cutting edge and said second cutting edge oriented at an angle of 75-85° with respect to each other, and a ratio of a length of said distal cutting edge between said second reverse bevel surface and third reverse bevel surface to the axial length of said first bevel surface is 1:2.5 to 1:3; and

a curved distal end surface at a distal end of said second longitudinal side surface of said body, said curved distal end surface extending from an outer peripheral surface of said second longitudinal side surface to said distal cutting edge and said distal tip of said body, and where said distal tip is oriented radially inward from said first and second longitudinal side surface, and said distal cutting edge extending from said distal tip to said curved surface on said second longitudinal side surface of said body, said distal cutting edge oriented at an angle relative to the longitudinal dimension of said body, and wherein said curved distal end surface forms a continuous curvature with said distal cutting edge extending between said outer peripheral surface and said distal tip, and where said distal cutting edge faces radially outward from said curved distal end surface, and said distal

cutting edge defined by said second reverse bevel surface and third reverse bevel surface has a curved profile and a distal end at said distal tip.

2. The needle of claim 1, wherein said second and third beveled surfaces have a longitudinal length of said at least one half of a longitudinal length of said first bevel surface.

3. The needle of claim 1, wherein said distal cutting edge defined by said second reverse bevel surface and third reverse bevel surface has a curved profile and has said distal end at said distal tip.

4. The needle of claim 1, wherein, said lumen having an inner diameter not more than ~~about~~ a radial dimension of an outer side wall of said body.

5. The needle of claim 4, wherein said lumen has an open distal end oriented between said distal tip and said first longitudinal surface of said body.

~~6. The needle of claim 1, wherein, said first bevel surface has a proximal end at said first longitudinal side surface; and a second bevel surface extends from a distal end of said first beveled surface to said distal tip, and said third bevel surface extends from said distal end of said first bevel surface to said distal tip.~~

~~7. The needle of claim 6, wherein said second bevel surface and said third bevel surface have a substantially concave surface.~~

~~86.~~ The needle of claim ~~6~~1, wherein said distal tip and said cutting edge formed between said second and third bevel surfaces are spaced radially inwardly from said outer peripheral surface and radially inwardly from an inner surface of said lumen.

~~97.~~ A catheter insertion device comprising:

a needle having a needle body having a longitudinal dimension with a proximal end and a distal end, a lumen extending between said proximal end and said distal end, a first longitudinal side surface, and a second longitudinal side surface opposite said first longitudinal side surface, said needle body having a first bevel surface having a proximal end at said first longitudinal side surface and extending at an angle of 17-22° toward said distal end; a second bevel surface extending from a distal end of said first bevel surface at an angle of 40-50° relative to a longitudinal axis of said needle to a distal tip, and a third bevel surface extending from said distal end of said first bevel surface at an angle of 40-50° relative to the longitudinal axis of said needle to said distal tip, and said second

and third bevel surfaces converging to form said distal tip and a distal cutting edge between said second and third bevel surfaces, where said distal cutting edge is oriented radially inward from said first longitudinal surface and radially inward from said second longitudinal surface, and oriented radially inward from an inner surface of said lumen~~and said distal cutting edge between said second bevel surface and said third bevel surface extends from said distal tip at said curved distal end surface to an inner surface of said lumen and faces toward said first longitudinal side surface and where an inner end of said distal cutting edge projects into an axial passage defined by said lumen;~~

said second longitudinal side surface at said distal end of said needle body having a curved distal end surface extending in said longitudinal dimension from an outer peripheral surface of said second longitudinal side surface of said needle body to a distal tip of said needle body, wherein said distal tip is spaced radially inward from said first longitudinal side surface and said second longitudinal side surface, and said distal cutting edge between said second bevel surface and said third bevel surface extends from said distal tip at said curved distal end surface to an inner surface of said lumen and faces toward said first longitudinal side surface and where an inner end of said distal cutting edge projects into an axial passage defined by said lumen, and said curved surface has a continuous curvature extending between said outer peripheral surface and said distal tip; and

a catheter positioned on said needle, where said needle is removable from said catheter.

~~108.~~ The catheter insertion device of claim 97, wherein said catheter is an IV catheter, and where said needle body has a blood flashback passage in communication with a blood control member.

~~119.~~ The catheter insertion device of claim 97, wherein said catheter includes a catheter hub and said needle body has a groove on an outer surface of said needle body forming a blood flashback passage between said needle body and said catheter.

~~1210.~~ The catheter insertion device of claim ~~108~~, wherein said blood flashback passage is a notch on an outer surface of said needle body in communication with said lumen in said needle body, and where said catheter includes a catheter hub connected to said blood control member.

~~13~~11. The catheter insertion device of claim ~~10~~8, wherein said lumen forms said blood flashback passage, and where said catheter includes a catheter hub connected to a needle hub forming said blood control member for receiving blood from said needle, and a guide wire extending through said lumen of said needle body.

~~14~~12. The catheter insertion device of claim ~~9~~7, wherein said curved distal surface forms a continuous curvature extending between said outer peripheral surface and said distal tip.

~~15~~13. The catheter insertion device of claim ~~10~~8, wherein said blood flashback passage is a longitudinally extending groove on an outer surface of said needle body.

~~16~~14. The catheter insertion device of claim ~~10~~8, wherein said blood flashback passage is a notch in said needle body forming an opening to said lumen and said device in communication with a blood control device, and a guide wire extending through said lumen of said needle body.

~~17~~15. The catheter insertion device of claim ~~10~~8, wherein said first bevel surface has a proximal end spaced from a center axis of said body on a side opposite said distal tip, and said second reverse bevel surface and said third reverse bevel surface.

~~18~~16. The needle of claim 1, wherein said first bevel surface is formed at an angle of 12-22° with respect to said longitudinal dimension of said body, said second reverse bevel surface and said third reverse bevel surface are inclined opposite said first bevel surface, and inclined relative to each other to form said distal cutting edge between said second reverse bevel surface and said third reverse bevel surface at an angle of ~~about~~ 60° to 70°, and said second reverse bevel surface and said third reverse bevel surface are formed at an angle greater than said angle of said first bevel surface.

~~19~~17. The needle of claim ~~18~~16, wherein a ratio of an axial length of said second reverse bevel surface and said third reverse bevel surface to an axial length of said first bevel surface is 1:1.5 to 1:1.8, and where a ratio of a length of said distal cutting edge between said second reverse bevel surface and third reverse bevel surface to the axial length of said first bevel is 1:2.5 to 1:3.

~~20~~18. The catheter insertion device of claim ~~9~~7, wherein said first bevel surface of said needle is at an angle of 17-22° and said second bevel surface and third bevel surface of

said needle are at an angle of 40-50° with respect to a longitudinal axis of the needle body.