The Dr. Ashby studies.
Breakdown. Part 4

In part 4, I'm starting to look into the 2007 updates. Interestingly, in 2007 part 1, Dr. Ashby complained about how people have interpreted a chart in the 2005 part 2 updates. Let's go back and look at the chart and what Dr. ashby is having an issue with what people say.

Ashby's chart

Chart 4
Summary: Extreme FOC's
$N_{Total}=39$

N=	% FOC	Arrow Mass	Avg. Pen.	Imp. KE	Imp. Mo.	% To Offside Rib	% Pen. Offside Rib	% Lethal	Broadhead	BH Wt.	# Exits
4	25.3%	620	12	35.24	0.44	25%	25%	**50%	*Grizzly	190	None
7	23.4%	637	19.66	35.30	0.45	100%	42.9%	100%	*Wolverine/STOS	160	2
3	25.0%	647	20.67	36.77	0.46	100%	100%	100%	*Mod. Grizzly	170	None
3	24.5%	649	20.60	34.62	0.45	100%	0%	100%	Pro Big Game	174	None
3	20.4%	682	19.17	40.49	0.50	100%	0%	100%	*Grizzly	145	None
1	20.8%	799	20.00	33.78	0.49	100%	100%	100%	*Mod. Grizzly	170	None
2	21.8%	812	20.82	34.83	0.50	100%	50%	***50%	*Eclipse	145	None
2	24.3%	848	20.75	35.31	0.52	100%	50%	100%	*Eclipse	145	None
6	25.4%	892	20.38	40.22	0.57	100%	50%	100%	*Mod. Grizzly	170	2
7	19.8%	919	20.36	35.76	0.54	100%	28.6%	100%	*Grizzly	190	None
1	27.9%	985	24.63	35.83	0.56	100%	100%	100%	Pro Big Game	258	None

*   Modified to COI Tip
**   Two shots failed to penetrate entrance rib.
*** One shot just back of diaphragm, missing liver.

"The sole purpose of Chart 4 was: (1) to present cumulative data for all Extreme FOC arrows tested to date; (2) illustrate suggestive data that the heavy bone threshold is persistent for Extreme FOC arrows and; (3) show that performance of Extreme FOC arrows tested had reached the measurable-penetration limit; requiring lower impact-force testing before the penetration-effect of Extreme FOC could be accurately quantified."

"Chart 4 is not a comparison of Extreme FOC arrows against that of their matched-sets. That information is in the (advantageously omitted) accompanying text. The bogus conclusions being circulated can only be made to appear plausible by excluding comparative data."

"The chart's accompanying text makes it difficult to understand how anyone could have read it and reached the conclusions being disseminated. It is only through ignoring the text's 'equal-dimension, equal-impact' test information, and the effect created by both the penetration-barrier and the measurable-penetration-limit (delineated in Updates) that anyone could misinterpret the chart as ==*indicating arrow FOC has no affect on penetration, or that impact kinetic energy predicted the penetration outcomes."*==*(Dr. Ashby)*

Let's look at what Dr. Ashby stated and break it down.

Chart 1

mass gr.	EFOC %	avg.pen. In	KE	mo.	fps		mass gr.	EFOC %	avg.pen.	KE	mo.	N=
test asian buffallo							gain/lost % based on arrow 1					
620	25.4	12	35.24	0.44	160.00	arrow 1	620	25.4	12	35.24	0.44	4
637	23.4	19.66	35.3	0.45	157.99	arrow 2	2.74%	-7.87%	63.83%	0.17%	2.27%	7
647	25	20.67	36.77	0.46	159.99	arrow 3	4.35%	-1.57%	72.25%	4.34%	4.55%	3
649	24.5	20.6	34.62	0.45	155.00	arrow 4	4.68%	-3.54%	71.67%	-1.76%	2.27%	3
682	20.4	19.17	40.49	0.5	163.52	arrow 5	10.00%	-19.69%	59.75%	14.90%	11.11%	3
799	20.8	20	33.78	0.49	137.99	arrow 6	28.87%	-18.11%	66.67%	-4.14%	10.00%	1
812	21.8	20.82	34.83	0.5	138.99	arrow 7	30.97%	-14.17%	73.50%	-1.16%	13.64%	2
848	24.3	20.75	35.31	0.52	136.95	arrow 8	36.77%	-4.33%	72.92%	0.20%	18.18%	2
892	25.4	20.38	40.22	0.57	142.51	arrow 9	43.87%	0.00%	69.83%	14.13%	29.55%	6
919	19.8	20.36	35.76	0.54	132.39	arrow 10	48.23%	-22.05%	69.67%	1.48%	22.73%	7
985	27.9	24.63	35.83	0.56	128.00	arrow 11	58.87%	9.84%	105.25%	1.67%	27.27%	1

Graph 1
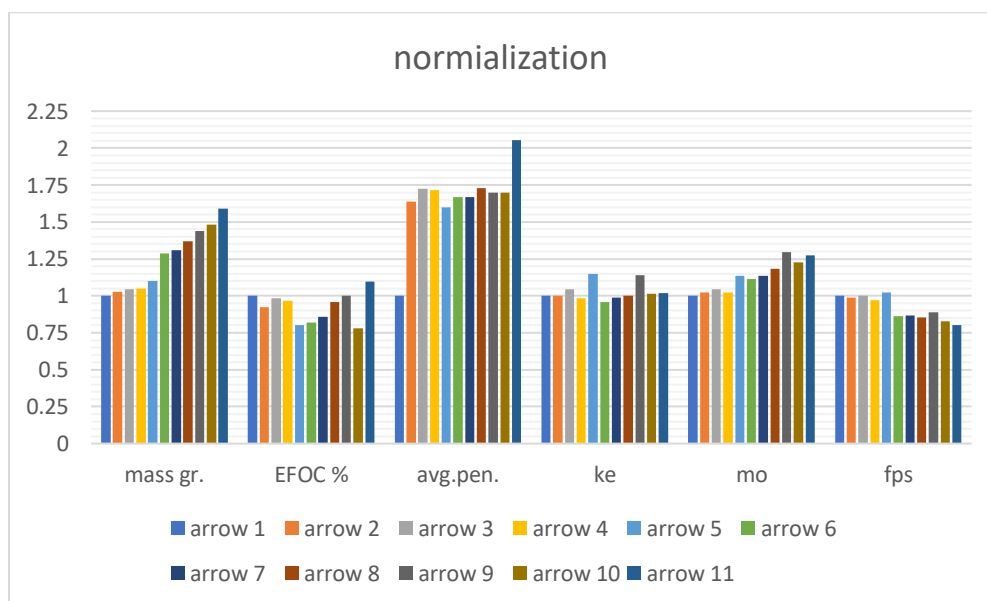
Chart 2

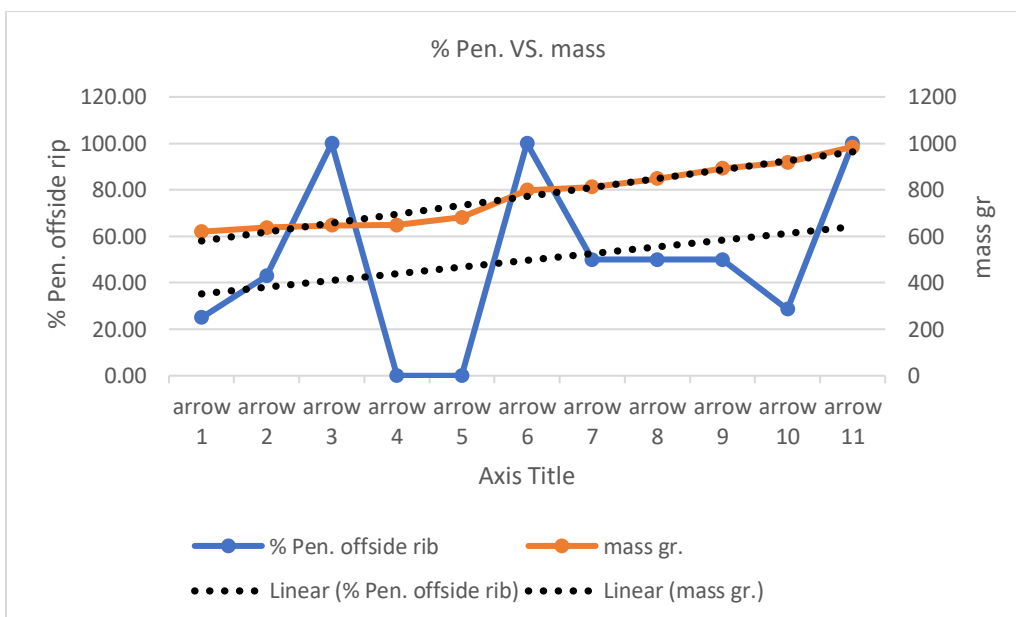|	mass gr.	% to offside rib	% Pen. offside rib	N=
arrow 1	620	25.00	25.00	4
arrow 2	637	100.00	42.90	7
arrow 3	647	100.00	100.00	3
arrow 4	649	100.00	0.00	3
arrow 5	682	100.00	0.00	3
arrow 6	799	100.00	100.00	1
arrow 7	812	100.00	50.00	2
arrow 8	848	100.00	50.00	2
arrow 9	892	100.00	50.00	6
arrow 10	919	100.00	28.60	7
arrow 11	985	100.00	100.00	1

Graph 2
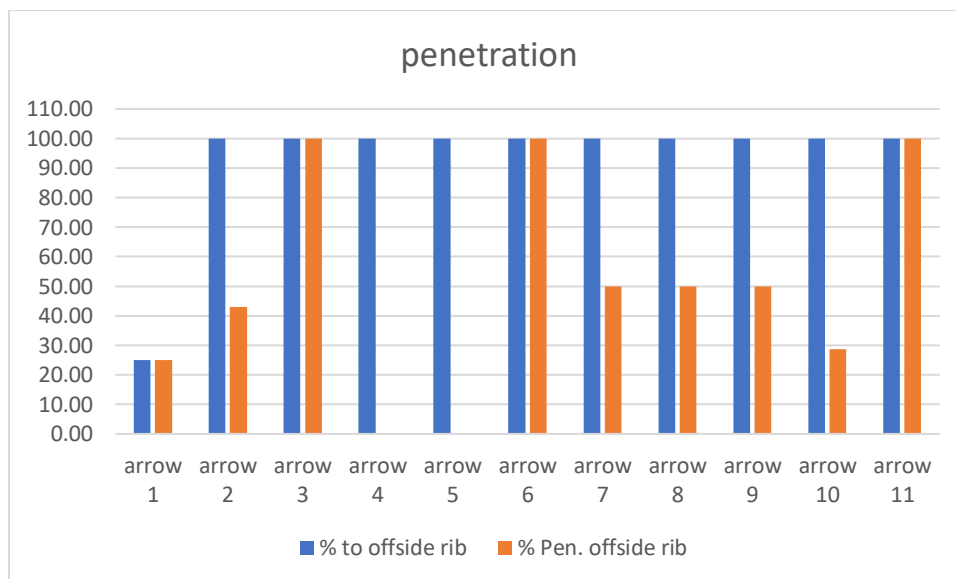
Graph 3
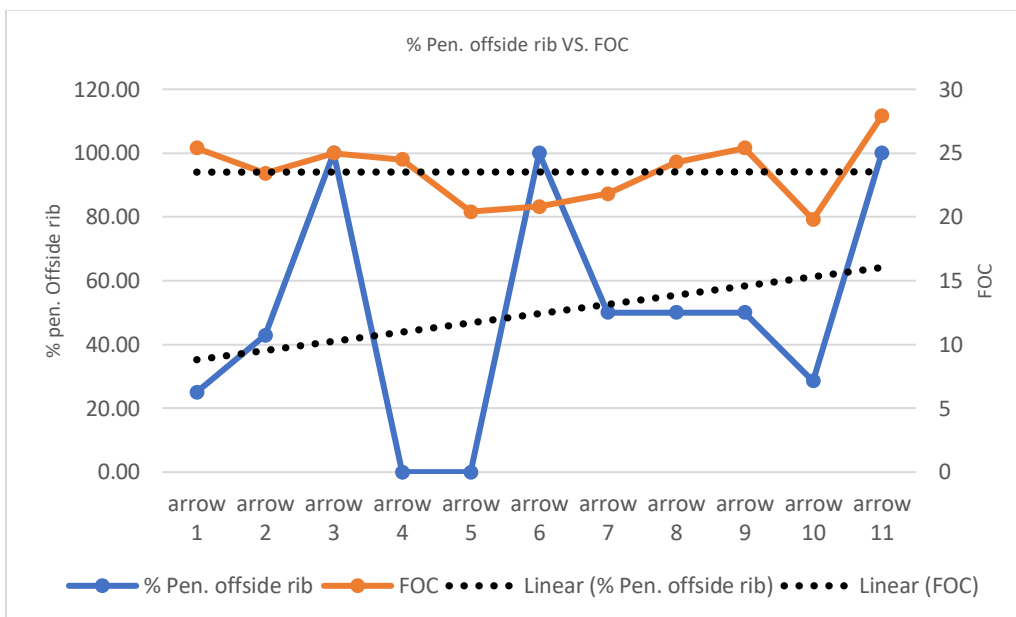
Graph 4

Read what I highlighted again, "***indicating arrow FOC has no affect on penetration, or that impact kinetic energy predicted the penetration outcomes.***"

Look at the chart from Dr. Ashby. Unless you can dig deep into his papers and find some of the omitted data, I cannot see any correlation with FOC in his chart vs. penetration. Look at graph 3. You will see the trend line is straight. This means the FOC is not changing much. Looking at Ashby's chart 4, the most significant change in FOC is 22.05%, but all arrows are still in the EFOC range. The lowest EFOC arrow is the 919gr vs. the second-highest EFOC arrow at 620gr. But yet the 919gr arrow out penetrated the 620gr arrow by 69.67%. Dr. Ashby is correct that the kinetic energy had nothing to do with the penetration increase. But look at graph 3 again. The trend line for FOC is straight. This means that the chart from Dr. Ashby's shows FOC did not have anything to do with penetration increase.

Now, look at graph 4. Here we are comparing mass vs. penetration. The trend lines are both increasing. What you are seeing is mass is what is the predictor and causing an increase in penetration. Not FOC nor KE.

Dr.Ashby is wanting to talk about comparing other data to the data in this chart 4. Doing this, he should have also listed that data. Showing data but talking about other data and trying to compare is confusing and hard to understand.

I looked at the data in the chart as he presented it. Then looked at the data from how he saw it. As you can see, it was not FOC that increased penetration. It was mass.

I want to make a note here. When testing, a goal is to have as many variables as removed. In chart 4 you will notice broadhead changes. What this does is skew a test. I want to point out just two of the broadheads: the grizzly and the modified grizzly. The grizzly had a MA OF 2.75, and the modified grizzly has a MA 3.25 as listed by Dr. Ashby. Again we can look at it as even a bad head design can work with enough mass.