

# Thoughts on special attacks

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## 1 Quantifying the power of special attacks

Before we go into detail with specific special attacks, it is instructive to develop a sensible metric which assesses how powerful a special attack (or ability) is. In other words how good a spec (or ability) is at dealing damage for how much adrenaline it costs. We can then use this metric to work out how strong a special attack needs to be to be competitive with other abilities. Intuitively, dividing the amount of damage a spec does on average by its adrenaline cost sounds like a good idea. However, this doesn't quite work as it does not take into account factors like the lost opportunity cost from some baseline ability you could have used instead of the spec in question (usually a basic ability), or how long the spec takes to execute/channel.

Instead we define the following metric, which I'll dub *Adrenaline Efficiency*, as a function  $f(D, A)$  of two variables  $D$  and  $A$ , where  $D$  is the damage the ability or spec attack you're interested in does on average and  $A$  is the adrenaline cost of the ability or spec attack you're interested in:

$$f(D, A) = (D - D_0)/(A + A_0)$$

$D_0$  is the damage of a 'baseline' basic ability you could have used instead of the ability or spec attack, and  $A_0$  is the adrenaline gained by using that basic ability.  $D_0$  and  $A_0$  are typically constant so I won't treat them as variables, though they can change depending on the situation. Intuitively, we are dividing the damage gained by using our spec or ability of interest over some average basic we could have used instead  $D - D_0$ , by the adrenaline cost, which also takes into account the  $A_0$  adrenaline we could have gained, so the true adrenaline cost is  $A + A_0$ . Intuitively, the larger the adrenaline efficiency of a spec/ability is, the more powerful it is. For the rest of this document, I will assume our 'baseline' basic ability does on average  $D_0 = 100\%$  damage (roughly equal to how strong a basic like Fury or Smash is), and gains  $A_0 = 10\%$  adrenaline (With Impatient 4 and Fury of the small, a basic ability gains about 10% adren on average).

This definition might seem a little abstract so hopefully the following worked example is illustrative: Suppose we have two abilities, Overpower which does 600% damage on average and costs 40% adrenaline (Overpower with the Zuk cape, using Vigour+CoE), and Hurricane which does 265% damage on average and costs 15% adrenaline. We would like to work out which of those 2 abilities is better use of adrenaline. Clearly in one gcd Overpower will do far more damage, but also costing much more adrenaline. So we would like to somehow compare Hurricane used twice vs Overpower used once. However, since using Hurricane

twice requires an extra gcd, we should also add the damage and adrenaline gained of some 'baseline' basic ability (100% damage, 10% adrenaline) to Overpower. Therefore, we have:

Using Overpower+baseline basic does on average 700% damage and costs 30% adrenaline overall (Overpower costs 40% but then the basic gains back 10%).

Using Hurricane twice does on average 530% damage and also costing 30% adrenaline.

It is therefore evident that Overpower does more damage than Hurricane for the same amount of adrenaline (outside of Berserk anyway). If the Adrenaline Efficiency metric we defined above is sensible, it should show that Overpower has higher adrenaline efficiency than Hurricane, and indeed it does. For Overpower,  $f(600, 40) = \frac{600-100}{40+10} = 10$  while for Hurricane,  $f(265, 15) = \frac{265-100}{15+10} = 6.6$ . In fact, a hypothetical threshold ability that does 350% damage on average in one gcd should match Overpower in adrenaline efficiency exactly (since it does 700% damage with two uses), and one can easily check that it does:  $f(350, 15) = \frac{350-100}{10+15} = 10$ .

This Adrenaline Efficiency metric has historically been quite accurate at predicting which abilities ends up getting used (by 'meta' players), and which ones don't. However, do keep in mind that this metric still only gives a simplified picture. Certain types of damage are more valuable than others depending on situation. For example, typically 'frontloaded' damage (abilities which do all its damage instantly) is more useful than more 'backloaded' damage (e.g. long bleeds like EZK) if the damage inflicted is the same in both cases, since some boss phases or healthbars are not long enough for all the backloaded damage to be dealt before the boss enters the next phase or dies.

So in order for (the currently not useful) special attacks to become viable, we have to either increase their damage or reduce their adren cost (or some combination of both) so that their Adrenaline Efficiency becomes comparable or exceeding that of abilities people currently use.

## 1.1 Melee specs

Melee is currently lacking a viable mid tier spec without a cooldown (like dbow or gstaff for range or magic) despite having the largest number of iconic specs pre-EoC so I think the priority for buffing specs should be buffing some of those iconic melee specs to make them more useful.

Once again in this section we'll assume  $D_0 = 100$  (baseline damage of basic you could have used instead of the spec) and  $A_0 = 10$  (adren gained by the basic). Ring of vigour's 10% cost reduction will also be assumed when calculating adrenaline efficiency.

As discussed in the previous section, under these assumptions, Overpower has adrenaline efficiency of 10, Hurricane has adrenaline efficiency of 6.6, and it's straightforward to show that Assault has adrenaline efficiency of also between 6 and 7. Therefore I think most of the special attacks below (at least ones without a secondary effect) should have their damage buffed to have adrenaline efficiency of at least 5 to be somewhat competitive with automatically unlocked abilities like Hurricane and Assault (otherwise there's little to no reason to use specs even at the level they are unlocked). For reference, Dbow spec in EoF

(which is considered good) has adrenaline efficiency of around 5.6. Most specs are currently significantly below thresholds in terms of adrenaline efficiency so quite significant buffs are needed to make them anywhere near viable.

In the following table we list a number of iconic melee special attacks, their current damage and adren cost, and how much damage or adren I think they should have. Unless stated otherwise, all proposed new numbers should apply to PvM only. I'm also aware ability damage% isn't an exact measure of how much damage a special will do in reality, primarily due to the damage cap, and I note this for any one hit specials that will frequently hit the cap. However, I will still use ability damage% to calculate damage and Adrenaline Efficiency in general as it's algebraically convenient, consistent across all builds/gear and is an adequate enough representation of actual damage when the damage cap isn't an issue.

| Weapon Name        | Current damage range (average damage), adren cost | Current Adrenaline Efficiency | Proposed damage range (average damage), adren cost            | Proposed Adrenaline Efficiency | Additional comments   |
|--------------------|---|-------------------------------|---|--------------------------------|---|
| Armadyl godsword   | 95%-375% (235%), 50%                              | 2.45                          | 350%-450% (400%), 50%   | 5.45                           | Damage cap for this spec should be raised to > 20k, or removed altogether                     |
| Bandos godsword    | 90%-350% (220%), 100%                             | 1.2                           | 275%-375% (325%), 50%   | 4.1                            | Damage cap for this spec should be raised to > 20k, or removed altogether                     |
| Saradomin godsword | 75%-275% (175%), 50%                              | 1.36                          | 275%-375% (325%), 50%   | 4.1                            | Damage cap for this should be raised to > 20k, or removed altogether                          |
| Zamorak godsword   | 75%-275% (175%), 60%                              | 1.17                          | 275%-375% (325%), 40%   | 4.89                           | Damage cap for this should be raised to > 20k, or removed altogether                          |
| Dragon dagger      | 40%-160%, 40%-160% (200%), 25%                    | 3.08                          | 90%-160%, 90%-160% (250%), 25%                                | 4.62                           | Slightly lower adren efficiency than dclaws due to innate accuracy bonus                      |
| Dragon claws       | 68%-180%, 54%-110%, 27%-55%, 27%-55% (288%), 50%  | 3.42                          | increase damage of each hit by 30% (374% avg), 50% adren cost | 4.98                           | Slightly lower adren efficiency than AGS due to quadruple hit                                 |
| Dragon longsword   | 50%-360% (167.5%?), 25%                           | 2.08                          | 160%-360% (260%), 25%   | 4.92                           | Get rid of the double random roll. Ideally damage cap for this spec raised to 20k or removed. |
| Dragon halberd     | 45%-185%, 45%-185% (230%), 30%                    | 3.51                          | 45%-185%, 45%-185% (230%), 30%                                | 3.51                           | No change to damage needed as AoE, but the current cooldown is not needed imo                 |
| Dragon mace        | 120%-300% (185%?), 25%                            | 2.62                          | 200%-300% (250%), 25%   | 4.62                           | Get rid of the double random roll. Ideally damage cap for this spec raised to 20k or removed. |
| Dragon 2h sword    | 20%-100% (60%), 60%                               | -0.625                        | 240%-360% (300%), 60%   | 3.125                          | Slightly lower adren efficiency than dhally due to latter having quest req                    |
| Korasi's sword     | 120%-320% (220%), 60%                             | 1.875                         | 240%-360% (300%), 50%   | 3.63                           | Same damage as d2h but lowered adren cost due to quest requirement                            |

These numbers are of course, just suggestions and not the only possible numbers to pick to rebalance specs to be more viable. I tried keeping adren costs the same or close to the original to preserve familiarity, but in principle you can also reduce adren cost more instead of primarily raising the damage of specs like I did (and some combination of both can also work), and the specs will still remain

viable provided their adrenaline efficiency is high enough to be competitive with abilities.