

Profiles, Chain Tuning, and Wind

Collision tuning boundary

Profile Radius, Chain Collision Radius, and Solver Iterations tune valid contacts; they are not a fix for a collider that already intersects the rig in its normal pose. Exclude that body collider on the affected chain under Collision > Excluded Reactive Colliders. This keeps the intended body contacts without forcing the solver to escape an embedded starting state.

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Reactive Bone motion is primarily controlled by reusable **Reactive Bone Profile** assets.

Create one from:

Assets > Create > STL Dynamics > Reactive Bones > Profile

or use the Setup Wizard's **Create Profile Asset...** button.

You can also create the entire preset library at once from:

Tools > STL Dynamics > Reactive Bones > Create Standard Profile Set

Included starting presets

V1 includes:

- Light Ponytail
- Heavy Ponytail
- Long Hair
- Short Hair
- Breasts
- Animal Tail
- Heavy Tail
- Cat Ears
- Long Ears
- Antenna
- Soft Body
- Backpack Strap
- Hanging Cable
- Tentacle
- Plant Stem
- Cloth Strip
- Cartoon Jiggle

Presets are starting points, not locked modes. Apply one and then tune it for your model scale, animation speed, and art direction.

Motion settings

Damping

Removes momentum over time.

Increase damping when motion rings or oscillates too long. Lower it for loose, lively motion.

Elasticity

Spring response toward the animated local segment direction.

Increase it when the chain should actively return toward animation rather than only settling through damping/constraints.

Stiffness

Angular resistance away from the animated bone direction.

Increase stiffness for short hair, ears, straps, stems, or anything that should resist bending.

Inertia

Resistance to root translation/rotation.

Higher inertia creates more lag behind character movement. Use it carefully on very fast animations; extreme root motion is stabilized automatically, but huge values can still make an object feel heavy or delayed.

Gravity

Continuous world-space acceleration applied to the simulated particles.

Use strong gravity for cables/cloth and much lighter gravity for compact jiggle motion.

External Force

Constant world-space acceleration added on top of gravity and wind.

Useful for a permanent directional bias.

Constraint settings

Radius

Base particle collision radius in world units.

The final particle radius can be scaled character-wide with **Chain Collision Radius** in the **Smart Collision Manager**. Keep profile radius focused on the material/shape of the chain, then use the manager for connected collision tuning.

Solver Iterations

Constraint passes per simulation step.

Higher values improve stability on difficult chains and collision but cost more CPU. Keep the profile low by default and override a specific chain only when necessary.

Maximum Displacement

Safety envelope around the animated target.

Set to zero to disable it. Otherwise it limits how far the simulation can drift away from animation.

Timing and Blend

Update Rate

Used by **Fixed Rate** chain update mode. 60 Hz is the general default.

Maximum Substeps

Limits catch-up work when a frame is late.

Default Weight

Default blend amount between animation and Reactive Bone simulation.

Along-chain curves

When enabled, profile curves multiply the base values from:

- root = 0
- tip = 1

Curves are available for:

- damping;
- elasticity;
- stiffness;
- inertia;
- radius;
- gravity;
- external force;
- maximum displacement.

This is one of the best ways to make a chain feel natural without creating separate profiles for every segment.

Examples:

- stiff root, loose tip;
- small root collision radius, larger midsection;
- low gravity near the attachment, full gravity at the tip;

- stronger maximum-displacement protection toward the free end.

Reactive Bone Chain simulation settings

The chain inspector can override or complement its profile.

Simulate

Master per-chain simulation toggle.

Weight

Runtime blend from animation toward solved Reactive Bone motion.

Update Mode

Fixed Rate

Recommended default. Runs fixed-frequency simulation scheduled from LateUpdate.

Late Update

One variable-time simulation step each rendered frame.

Fixed Update

Consumes Unity FixedUpdate ticks and renders the result after animation.

Unscaled Time

Uses unscaled frame time.

Override Solver Iterations

Lets one difficult chain use more or fewer iterations than its shared profile.

Maximum Deflection Angle

Restricts how far a segment can bend from its current animated direction. 180
effectively disables the angular limit.

This is especially useful for compact soft-body/jiggle chains that should not fold through their attachment during aggressive animation.

Teleport detection

Teleport detection prevents a chain from trying to physically simulate across a huge instantaneous character movement.

Controls:

- **Detect Teleports**
- **Teleport Distance**
- **Teleport Angle**

Keep it enabled for characters that can respawn, warp, fast-travel, or be repositioned by networking/gameplay code.

Wind

Add:

STL Dynamics > Reactive Bones > Reactive Bone Wind Zone

Wind zones apply directional acceleration with deterministic turbulence.

Modes:

Global

Affects eligible chains everywhere.

Sphere

Applies within a spherical region with falloff.

Box

Applies within a box region with falloff.

Settings:

- local direction;
- strength;
- turbulence;
- frequency;
- falloff;
- sphere radius or box size;
- optional Profile Filter.

The **Profile Filter** is useful when only specific materials should react to a zone - for example, cloth/hair profiles but not a heavy tail.

Practical tuning order

When a chain does not feel right, tune in this order:

1. Choose the closest preset.
2. Tune **Stiffness** for how far it is allowed to bend.
3. Tune **Inertia** for movement lag.
4. Tune **Damping** for settling time.
5. Tune **Elasticity** for return-to-animation response.
6. Set appropriate **Gravity**.
7. Use root-to-tip curves.
8. Only then increase solver iterations if the issue is actual constraint/collision stability.

That keeps artistic tuning separate from brute-force solver cost.